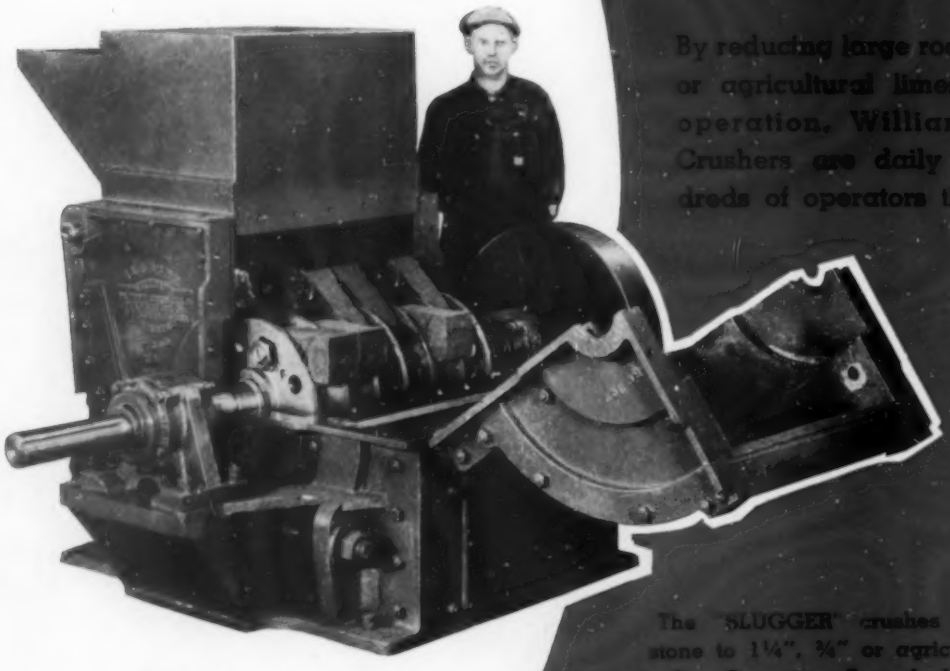
Rock Products

THE INDUSTRY'S RECOGNIZED AUTHORITY

JULY 1940

Reduce "One Man" Size Stone to 1¼", ¾" or Agstone in One Operation at the Rate of 6 to 300 Tons Per Hour



Above: Open view of Williams "Slugger" Crusher showing heavy duty hammers, liners and discs.

Below: Sectional view showing Williams Hammer Principle of crushing.

By reducing large rock to 1¼", ¾" or agricultural limestone in one operation, Williams Hammer Crushers are daily saving hundreds of operators the additional expense of unnecessary primary crushers.

The "SLUGGER" crushes ONE MAN size stone to 1¼", ¾" or agricultural limestone in One Operation. By reducing large stone to those sizes in one operation the "Slugger" has enabled operators to produce these sizes at a low cost per ton and with small investment. Seven sizes—6 to 150 tons hourly capacity.

The "JUMBO" crushes ⅜ yard to 1¼ yard Power Shovel Loaded Rock to 1¼" in ONE OPERATION. By doing all the work in one operation with one crusher there is a big reduction in the costs of foundations, drives and buildings as well as power requirements. Six Sizes—50 to 300 tons hourly capacity.

"Write today for additional information on Williams Hammer Crushers."

THE WILLIAMS PATENT CRUSHER & PULVERIZER CO.

800 St. Louis Ave.
ST. LOUIS, MISSOURI

Sales Agencies Include

Chicago — 37 W. Van Buren St.
New York — 15 Park Row

Oakland, Calif.
1629 Telegraph Ave.

Williams
OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD
PATENT CRUSHERS GRINDERS SHREDDERS

● For smooth, dependable, low-cost conveying and power transmitting service—use Link-Belt chains. We make all types of malleable iron, Promal, steel, stainless steel, bronze and other alloy chains and are free to recommend the best one for the purpose . . . including sprockets, shafting, bearings, collars, clutches, take-ups, couplings; in fact, everything to make your installation give trouble-free, long-life service.

Today—throughout the world—Link-Belt chains are accepted as the recognized standard. They are backed by 65 years of chain making experience.

Large stocks are carried at Link-Belt plants and warehouses and by authorized distributors.

LINK-BELT COMPANY

Indianapolis · Chicago · Philadelphia · Atlanta · San Francisco · Toronto · Offices in Principal Cities

LINK-BELT CHAINS

7940

OF MALLEABLE IRON, PROMAL, BRONZE, STEEL, ALLOYS

NEXT MONTH'S ISSUE

Some unusually timely articles will appear in the August Special Cement Issue of ROCK PRODUCTS which will go to the heart of problems now confronting the industry. New A.S.T.M. cement specifications, the latest methods employed to sample raw materials and clinker, accurate proportioning of raw materials and the most recent advances in equipment for this purpose, dust collectors and their application in various parts of the plant, and the bin storage problem—these special subjects will be featured and in addition there will be articles on recent cement plant improvements which will serve to point out trends. A special tinted paper will be used in this section.

In addition to the special cement section, there will be articles describing new sand and gravel and crushed stone plants, further installments of the very practical Shaw series of articles on sand classification and Nettleton's series on crushing, sizing and testing of aggregates.

Five New Cements

The American Society for Testing Materials has recommended for adoption five new cements. In the coming issue these new specifications will be interpreted by authorities, and some of the problems involved in their manufacture will be given consideration.

Sampling Methods

Demands for new cements call for greater refinement of methods in sampling both raw materials and clinker. Methods and equipment now being used and the adaptation of devices employed in other chemical processes will be described and illustrated.

Bin Storage Problem

Tied in with the problem of meeting new specifications for cement is the problem of furnishing sufficient storage. Executives of cement companies, prominent government officials, and testing engineers have given their opinions and suggestions for meeting this situation in an article of unusual interest.

Dust Collection

Ways and means of adequately recovering and utilizing the dusts generated in the manufacture of cement continue of paramount interest. Some of the latest methods and equipment adopted by companies to find an economical use for recovered dust will be described and illustrated.

Blended Sand

Federal specifications for concrete aggregates have called for more fine sand closely blended with the other materials. Not having sufficient fines in the raw material, one operator has found it profitable to grind concrete sand to secure the necessary percentage of this gradation. The aggregates are then carefully blended by weight in a special plant.

Concrete Products

High-pressure steam curing, a modern concrete burial vault plant, the use of radio to sell ready mixed concrete, and several other articles dealing with new types of masonry units, and cast stone will appear in the coming issue.

ROCK PRODUCTS

RECOGNIZED THE WORLD OVER AS THE LEADER IN ITS FIELD

With which has been consolidated the journals *Cement and Engineering News* (founded 1896) and *Concrete Products* (established 1918)

VOL. 43, No. 7

Contents for July, 1940

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ROCK PRODUCTS Bears the Twin Hall-Marks of Known Value.

Audit Bureau of Circulations ← Impartial measurement of reader interest in terms of paid circulation.

Authentic facts relating to editorial scope and readership analysis. → ABP

(PUBLISHED MONTHLY AT CHICAGO, ILL., U. S. A.)

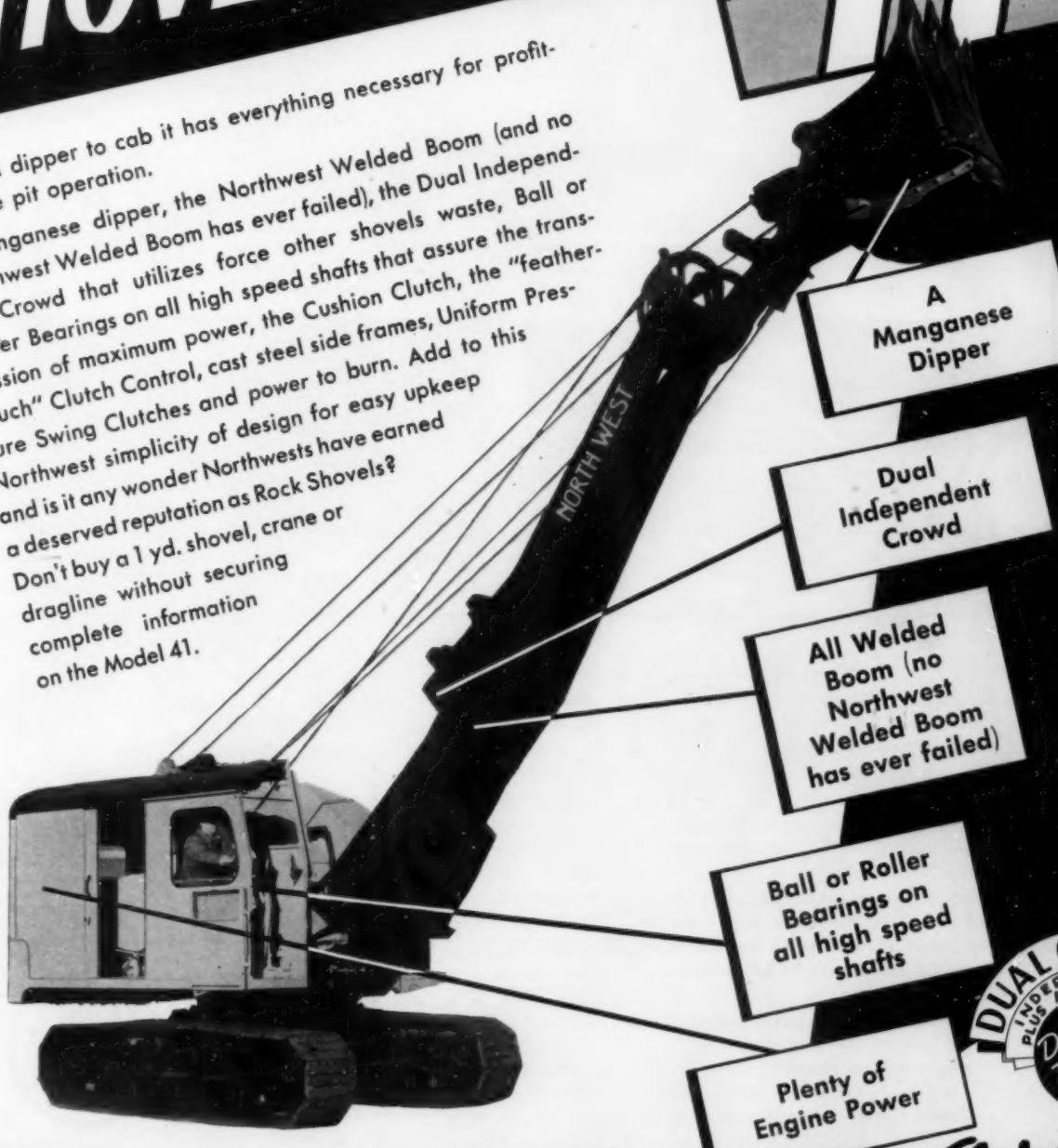
Entered as second-class matter, Jan. 30, 1936, at the Chicago, Ill., postoffice under the Act of March 3, 1879.

A REAL ROCK SHOVEL this- Model 41

FROM dipper to cab it has everything necessary for profitable pit operation.

A manganese dipper, the Northwest Welded Boom (and no Northwest Welded Boom has ever failed), the Dual Independent Crowd that utilizes force other shovels waste, Ball or Roller Bearings on all high speed shafts that assure the transmission of maximum power, the Cushion Clutch, the "feather-touch" Clutch Control, cast steel side frames, Uniform Pressure Swing Clutches and power to burn. Add to this Northwest simplicity of design for easy upkeep and is it any wonder Northwests have earned a deserved reputation as Rock Shovels?

Don't buy a 1 yd. shovel, crane or dragline without securing complete information on the Model 41.



A Manganese Dipper

Dual Independent Crowd

All Welded Boom (no Northwest Welded Boom has ever failed)

Ball or Roller Bearings on all high speed shafts

Plenty of Engine Power

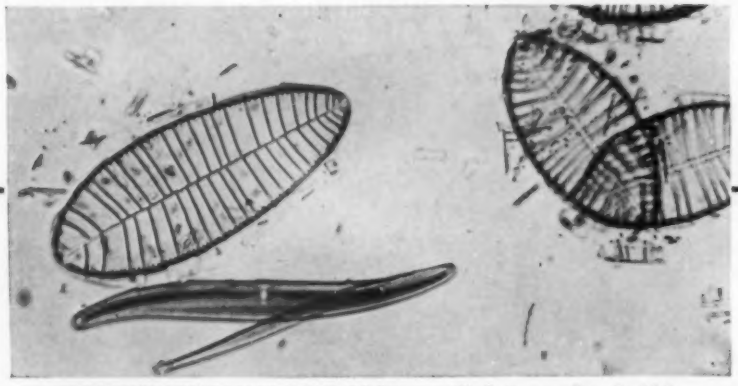
DUAL CROWD
INDEPENDENT PLUS AUTOMATIC
Digging Power Plus

NORTHWEST ENGINEERING COMPANY
1820 Steger Building, 28 East Jackson Boulevard, Chicago, Illinois

NORTHWEST

A real Rock Shovel

Excavating Diatomaceous Earth



PHOTOMICROGRAPH OF DIATOMS, highly magnified, the remains of which make up the "diatomaceous earth" being excavated and processed.

GENERAL VIEW of The Oromite Co.'s deposit of diatomaceous earth near Terrebonne, Oregon. All machinery and equipment are Texaco fueled and lubricated 100%.

PROCESSING PLANT for grinding, screening, and treating diatomaceous earth for use in dozens of industries as mineral fillers and filteraids.

WITH LARGE DEPOSITS of diatomaceous earth in Oregon, The Oromite Co. supplies mineral fillers for paper, plastics, rubber and hundreds of other products under the name of Dicalite.

This diatomaceous material is also an ideal filtering medium for countless liquids, including acids, chemicals, dyestuffs, foods, soaps, waxes.

All shovels, motor trucks and other equipment used in getting this material to the processing plants, as well as all equipment in the plants themselves, are TEXACO lubricated 100%.

Texaco Crater on open gears prolongs their life by reducing friction, preventing rust and corrosion.

Texaco Crater penetrates wire rope to the core, protecting each strand against wear and weather.

Trained lubrication engineers will gladly demonstrate savings with *Texaco Crater* on your wire rope and gear teeth. Phone the nearest of more than 2300 Texaco warehousing points, or write:

The Texas Company, 135 East 42nd St., New York, N. Y.

Texaco Dealers invite you to tune in The Texaco Star Theatre —starring Kenny Baker and Frances Langford—Every Wednesday Night—Columbia Network—9:00 E.D.T., 8:00 E.S.T., 8:00 C.D.T., 7:00 C.S.T., 6:00 M.S.T., 5:00 P.S.T.

TEXACO CRATER BOOKLET
32 pages of where to use Crater, and how. Also are shown simple rigs for quick and easy application to wire rope. Yours for the asking.

OTHER TEXACO PRODUCTS in use in this diatomaceous earth treatment plant are *Texaco* Fire-Chief *Gasoline, Insulated Havoline Motor Oil, Texaco Marfak, Texaco Thuban, Texaco Starfak Grease, Texaco Alcaid Oil, Texaco Crusher Oil.*

TEXACO
REG. U.S. PAT. OFF.

TEXACO CRATER

CONSTANT GAUGE HOLES

And why Timken Bits drill them . .

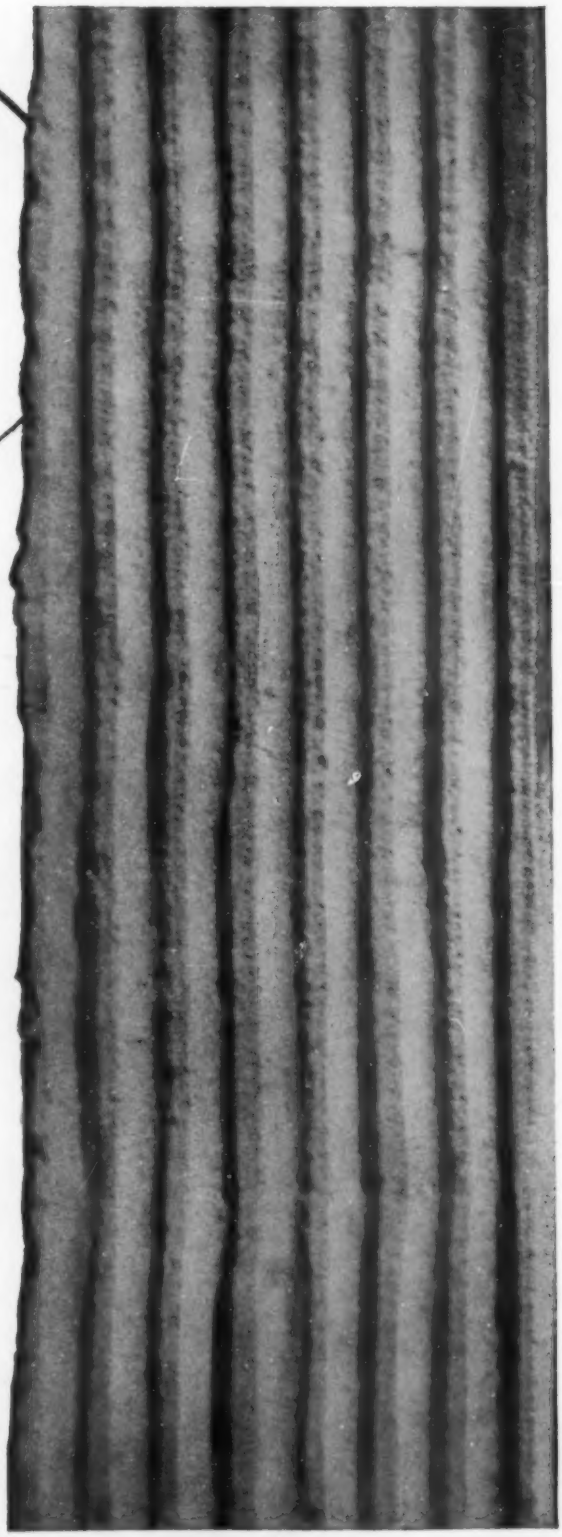
"Constant gauge holes" through the use of TIMKEN Rock Bits is the answer to every dimensional stone quarry operator's prayer. For constant gauge holes greatly facilitate subsequent broaching operations and moreover result in minimum loss of material through even fracture.

Here's why TIMKEN Removable Rock Bits can drill constant gauge holes *economically*. When the bit begins to get dull—it is removed and a sharp bit of identical gauge is attached to the same steel. Thus, it is necessary to carry only a small steel inventory whereas in the case of forged steel bits the inventory necessary to obtain constant gauge holes is prohibitive.

If you are in the dimensional quarry business and are not drilling constant gauge holes, why not let us demonstrate what TIMKEN Bits will do? Write us immediately. No charge, of course.

TIMKEN
ROCK BITS

Manufacturers of TIMKEN Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; TIMKEN Alloy Steels and Carbon and Alloy Seamless Tubing; and TIMKEN Rock Bits.



Sample of cores left by drilling constant gauge holes with TIMKEN Bits. Note cores same size from top to bottom thus facilitating broaching.

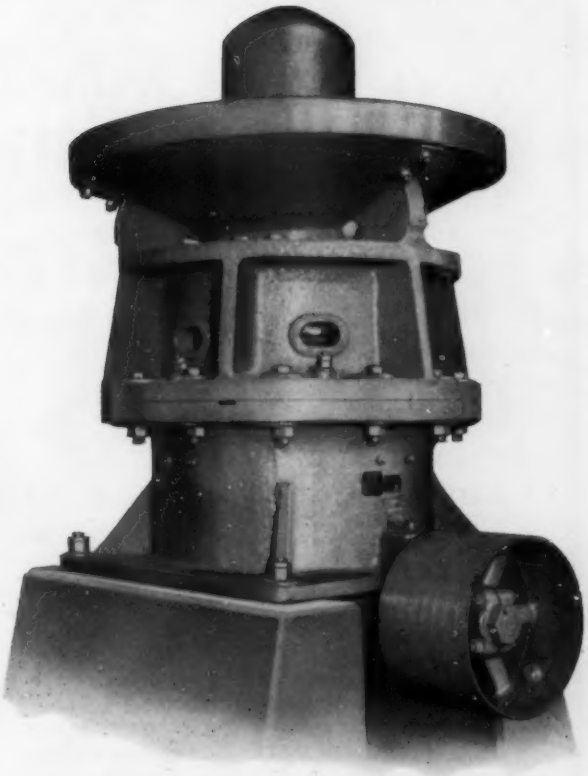
THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Fine Product-

exactly as you want it — as much as you want of it —

WITH OUR

Multi-Stage Fine Reduction Crusher



WE BUILD

Rotary Kilns
Rotary Coolers
Rotary Sinkers
Scrubbers
Evaporators
Jaw Crushers
Gyratory Crushers
Reduction Crushers
Crushing Rolls
Grinding Mills
Ball Mills
Rod Mills
Tube Mills
Pug Mills
Wash Mills
Feeders
Rotary Screens
Elevators
Welded or Riveted Stacks, Tanks and Bins for any purpose.

Here is a Reduction Crusher that accomplishes fine crushing, (to 9/16" and smaller), of any material, on a highly profitable basis, because it eliminates the trouble and inconvenience heretofore experienced in service of this character.

This efficiency is achieved by the use of TWO crushing chambers, of which the upper one serves as a feeder for the lower, supplying, all around the crushing bowl of the latter, material that has been partly crushed, and therefore of uniform character. Each chamber or stage is adjustable, independently of the other, so that the lower stage may be furnished, at all times, with exactly the quantity of feed required for operation under ideal conditions.

Both chambers are fitted with manganese steel Traylor Original, Patented, Non-Chokable Bell Head and Curved Concaves, which over seven hundred operators, in scores of industries throughout the world, are using, to their profit and satisfaction.

Space is not available to enlarge upon other exclusive features of this crusher—cast steel frame, all around bottom discharge, cut gearing, automatic lubrication, positive dust exclusion, tramp iron protection, etc.,—but Bulletin 113, which "tells all" will be sent promptly on request.

TRAYLOR

ENGINEERING & MANUFACTURING CO.

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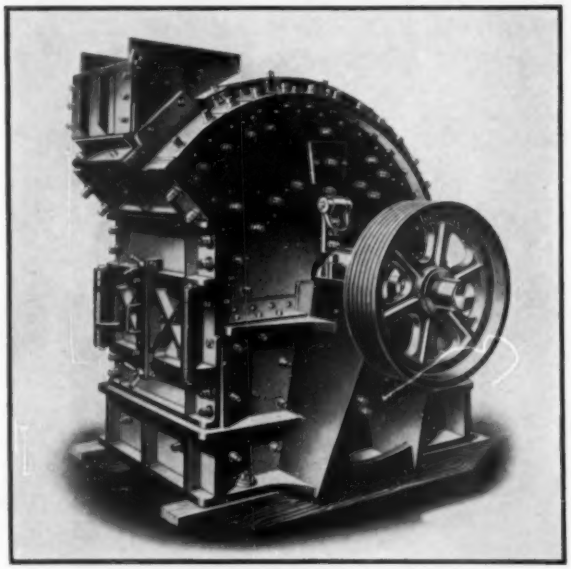
THE *Dawn* OF AN ERA

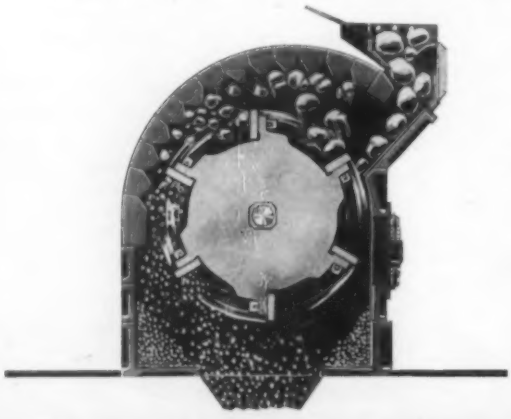
Introducing the Cedarapids "KUBIT" *IMPACT* BREAKER



Licensed Under U. S. Patent No. 1996485

WHAT IS THE "KUBIT" IMPACT BREAKER?

The "Kubit" Impact Breaker is a slow-speed fixed bar breaker which produces a uniform cubical product in any size required, by simple variation of speed. *It is not a hammer mill, not a jaw crusher, not a roll crusher, not a gyratory crusher — but a NEW, yet proven, machine operating on an entirely different principle.* Hundreds of "Kubit" Breakers, in service all over the world, have proven their superiority over all conventional crushers for the production of aggregate LOW IN PERCENTAGE of elongated and thin slabby pieces of material. The sensational success of this equipment in breaking stone, gravel, flint, slag and other material is due to the IMPACT principle. . . . Some of the many cost-reducing features of the Cedarapids "Kubit" Impact Breaker are: Reversible and interchangeable manganese steel impact bars — reversible manganese steel breaker bars that can be easily replaced — manganese steel body liners — heavy steel rotor — exceptionally large and dust-protected bearings — inspection doors that ensure quick access to the interior of the machine — slow speed and low horsepower — big production. This equipment is ruggedly built to give maximum performance handling all materials.



THE "KUBIT" *IMPACT PRINCIPLE*

In the "Kubit" Breaker, the stone or other material is broken solely by IMPACT. Breaker bars, rigidly fixed to a balanced rotor, throw the material with shattering force against the V-shaped impact bars, splitting the material along its natural grain. The broken pieces rebound from the impact bars to be again thrown against successive bars, as the product travels downward. The broken material leaves the machine through the large opening in the bottom of the breaker. This discharge opening is unrestricted by grid bars or screen. There are no grates to wear out.

The size of the broken material varies according to the speed of the rotor. Higher speed produces smaller material. Since there is no grinding action employed, the finished product is uniformly angular and cube shaped.

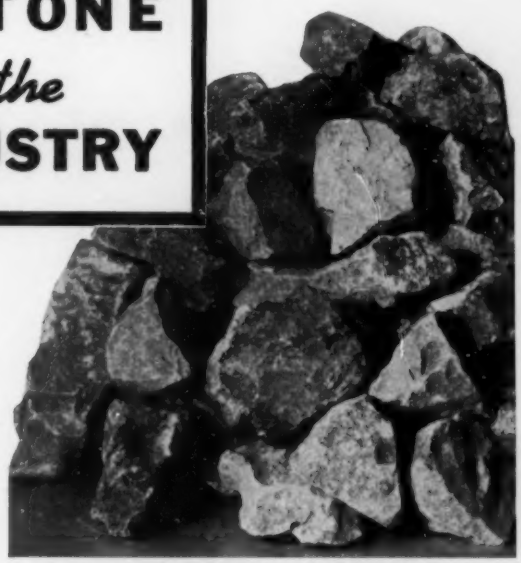
Cedarapids

PORTABLE and STATIONARY

CRUSHING PLANTS — ASPHALT MIXING PLANTS
WASHING PLANTS — MATERIAL HANDLING EQUIPMENT

IN THE *New* STONE AGE

"KUBITIZED" STONE
A Life Saver for the AGGREGATE INDUSTRY



Unretouched Photo of "Kubitized" Stone Passing 1" Screen

IMPORTANT ADVANTAGES

- **All grades and sizes are cube shaped.**
- **The percentage of elongated and slabby pieces is negligible**
- **All material is broken across its weakest point, by impact, eliminating soft stone and partially fractured pieces.**
- **In "Kubitized" Gravel all pebbles are broken into cube shapes resulting in 50% longer life for road surfaces.**
- **"Kubitized" products yield super-strength concrete.**
- **"Kubitized" materials are stronger, will withstand more strain and pressure than any other aggregates for all types of construction.**
- **"Kubitized" aggregates meet the most rigid specifications of engineers.**

"Kubit" in the plant of G. G. Hill, Dexter, Missouri.

IT WILL PAY YOU TO "KUBITIZE" NOW

The Cedarapids "Kubit" Impact Breaker offers a solution to many problems of the rock and gravel industry. Engineers are specifying cubed material — modern construction demands this superior product — here is your opportunity to meet this demand — install Cedarapids "Kubit" Impact Breakers NOW. The Cedarapids "Kubit" makes a consistently good product to fulfill the most rigid requirements of engineers and architects on all types of construction where aggregates are employed.

Don't Wait! **Write today for complete information. Send us a 200 lb. sample of your material with specifications for finished material you want. We will "Kubitize" your sample and return it to you with a screen analysis. Let us prove that "Performance Pays."**

Member American Road Builders Ass'n.

Manufactured by
IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa

Cedarapids

WHAT ARE THE BIG PROBLEMS

of the

PORTLAND CEMENT INDUSTRY TODAY?

- How can the industry meet the demand for more and more bins of "special cement" for customers large and small?
- Do we want cement merely with a high specific area, or do we want a proper gradation of particle sizes?
- What method of sampling raw materials will best predetermine nature of finished cement?

Presidents, vice-presidents and chemists of cement companies, testing engineers, buyers of cement and equipment manufacturers are contributing their ideas as to the best solutions.

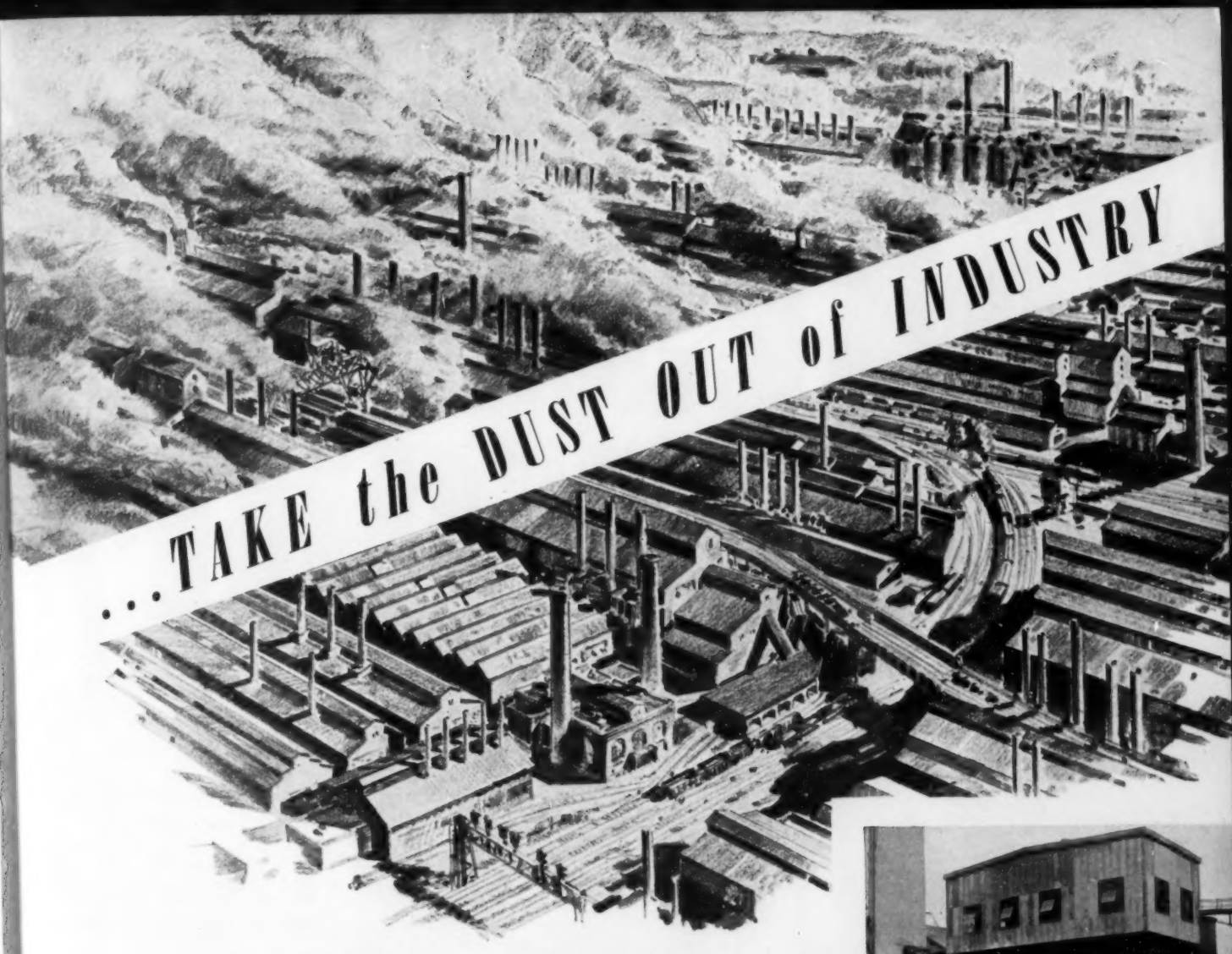
To Equipment Manufacturers:

This presentation of the solutions to the industry's most pressing problems guarantees unexcelled reader interest. The 1939 Cement Issue was sensational. This year it will be even better—unquestionably the opportunity of the year for the manufacturers of equipment and supplies for the cement industry. Special sepia section available without extra charge. Make your reservation NOW for choice position.

AUGUST—

The 1940 CEMENT NUMBER

ROCK PRODUCTS 309 W. Jackson Blvd. CHICAGO, ILLINOIS



• Four classifications cover the entire range of dust collection and gas cleaning:

1. Collecting waste material from waste gas —fly ash.
2. Collecting waste material from valuable gas—blast furnace gas.
3. Collecting valuable material from waste gas—smelter fume.
4. Collecting valuable material from valuable gas—manufactured gas.

• The Cottrell Process of Electrical Precipitation is the only method that is applicable to all four classifications with equal success and efficiency in each.

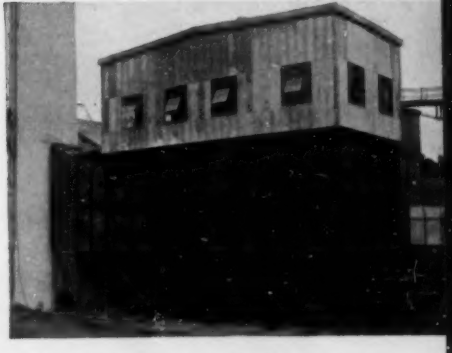
• Each classification covers a wide range of industries, but Cottrells perform as economically in each industry as in each classification.

• What other equipment can clean red hot gas? or operate in a vacuum? or take water out of blast furnace gas?

• *Cottrells do everything that any other type of collector can do—at a lower cost, and do many things that no other type can do—at any cost.*

• This fact should leave no doubt in your mind as to your preference for a Cottrell. Considered from every viewpoint—initial cost—collecting efficiency—power cost—draft loss—maintenance expense—attendance—capacity—versatility—obsolescence—life: the leadership of Cottrells is convincingly demonstrated in more than 3000 successful installations in 31 countries.

• Appraise your plant. Are you losing the good will of your community or damaging your equipment and product by air-pollution? Are you wasting recoverable values? In either case—(no operating industry is dust-free) we offer our comprehensive experience and exhaustive research facilities for your use.



COTTRELLS IN THE CEMENT INDUSTRY

The principal advantage resulting from the use of Cottrells in cement plants is the elimination of the heavy dispersion of dust over the surrounding area. In many cases, however, most of the recovered dust is returned to the kilns. The dust being collected by all the Cottrells now being operated in cement plants amounts to many thousands of tons a day.

WESTERN PRECIPITATION CORPORATION
1016 W. NINTH ST., LOS ANGELES, CALIFORNIA • CHRYSLER BLDG., NEW YORK
PRECIPITATION COMPANY OF CANADA, LTD.
DOMINION SQUARE BUILDING, MONTREAL, QUEBEC

Write for a copy of this new Booklet containing a history of the Cottrell Process and performance facts in the major industries of the world.

COTTRELL
ELECTRICAL PRECIPITATORS

TAKE THE DUST *OUT OF INDUSTRY*

NEW LOW COST TYPE "R" CRUSHER

TAKES LESS TIME OUT

WITH A FEW TWISTS on the hand crank, you can get any setting you want. Driven by a Lo-Maintenance Motor and Texrope Drive, the new Type "R" gives you reliable, low-cost operation.

Let Allis-Chalmers Cooperative Engineering help you cut your operating costs!

for SETTINGS . . . for TRAMP IRON . . . for POWER INTERRUPTIONS!

Three-Way Time-Saving Features of New Allis-Chalmers Type "R" Crusher Give you Quantity Production of Uniform, Cubical Stone . . . at LOWER COST! Read This Money-Saving News about the Fast-Selling Type "R" You Can Get at a Price Below Any Comparable Fine Reduction Crusher on the Market Today!

WE SINCERELY believe the new Type "R" Crusher is the answer to the industry's demand for a low-cost crusher capable of high capacities . . . a uniform, cubical product. And here's why!

LESS TIME OUT FOR SETTING! You can change settings for size with the Type "R" *in less time* . . . with a few twists of a hand crank. Built-in hydraulic jack does the work for you . . . gives you an exact setting anywhere within the range of this modern, low-cost crusher.

LESS TIME OUT FOR TRAMP IRON! You get greater protection from tramp iron with the Type "R". The effective release device passes ordinary tramp iron *fast* . . . protects your crusher . . . minimizes outage time.

LESS TIME OUT FOR POWER INTERRUPTIONS! Here's what actually happened in a large eastern crushing plant when a power interruption left the crushing chambers jammed with feed. It took 2½ hours to put their ordinary crusher back in operation . . . but their Type "R" was turning out stone after only a 15 minute delay! Think what dividing your lost production time by *ten* could mean to the production schedule in your plant!

Remember . . . 322 Type "R" Reduction Crushers are carried in stock . . . ready for immediate delivery anywhere! And here's the clincher — you get the Type "R" Crusher with all its money-saving features at a *cost that's actually less* than you pay for any comparable machine on the market today!

Get Cost-Cutting Service!

When you install a Type "R" Crusher . . . or any one of the complete line of Allis-Chalmers products . . . you're sure you get equipment that gives you long years of cost-cutting service.

Whenever you have a problem that needs real engineering, Allis-Chalmers cooperative engineering can save you money. Working with your own engineers, the Allis-Chalmers crushing specialists will be glad to analyze your problem . . . give you an unbiased recommendation for the most economical solution. Get in touch with the district office near you, or write direct to Allis-Chalmers, Milwaukee, Wis.

A 1210

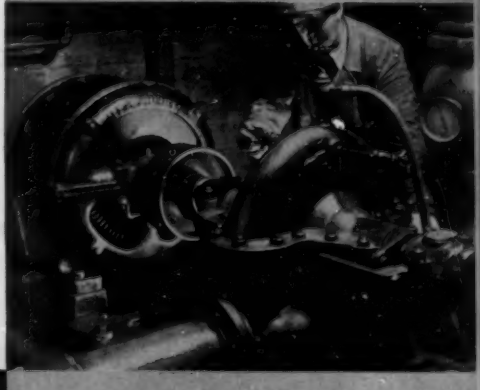
ALLIS-CHALMERS

MILWAUKEE · WISCONSIN

News of other Allis-Chalmers Products that cut your costs!

IN CRUSHING PLANTS ALL over the country, the Allis-Chalmers Low-Head is proving why it's the fastest selling screen on the market today. Space-saving adaptability plus positive vibration give you a better product at lower cost.

SENSITIVE, RELIABLE VA-riable speed control is obtained with the Allis-Chalmers Vari-Pitch Speed Changer. Here is a unit driving a separator in a mid-western lime plant.



MORE WATER AT LESS cost . . . that's the reason Allis-Chalmers centrifugal pumps are a favorite among operators for washing, drainage and allied crushing plant applications.

Acme Steel Co.
Ajax Flexible Coupling Co.
Allis-Chalmers Mfg. Co.
American Can Co.
American Chain & Cable Co.
American Gas Furnace Co.
American Laundry Mach. Co.
American Locomotive Co.
Anaconda Copper Mining Co.
Anchor Post & Fence Co.
Appleton Electric Co.
Armstrong Machine Works
Atlas Lumnite Cement Co.
Atlas Powder Co.
Bakelite Corp.
Baldwin Belting & Leather Co.
Baldwin-Duckworth Div.
Baldwin-Southwark Corp.
W. F. & John Barnes Co.
Bethlehem Steel Co.
Black & Decker Mfg. Co.
Blaw-Knox Co.
Brown & Sharpe Mfg. Co.
Bucyrus Erie Co.
Bullard Co.
Butler Mfg. Co.
Byers Machine Co.
Calco Chemical Co.
Canadian Ingersoll-Rand Co.
Canadian Westinghouse Co., Ltd.
Carboloy Co., Inc.
Carrier Corp.
Carter Carburetor Co.
Celluloid Corp.
Century Electric Co.
A. B. Chance Co.
Chicago Bridge & Iron Co.
Chicago Molded Products Co.
Cincinnati Bickford Tool Co.
Cincinnati Milling Machine Co.
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Columbia Alkali Corp.
Combustion Engineering Co.
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Crown Cork & Seal Co.
Cuno Engineering Corp.
Cutler-Hammer Inc.
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Diehl Mfg. Co.
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Dodge Mfg. Corp.
Dole Valve Co.
Domestic Engineering Co.
Duff-Norton Mfg. Co.
DuPont Co.
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Ex-Cell-O Corp.
Fafnir Bearing Co.
Fairbanks Morse & Co.
Farrel-Birmingham Co., Inc.
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Flintkote Co.
Foote-Burt Co.
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Foster Wheeler Corp.
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Hevi Duty Electric Co.
Hilo Varnish Corp.
Hotstream Heater Co.
Hyatt Bearings Div.
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Lindberg Engineering Co.
Link-Belt Co.
Locke Insulator Co.
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Manhattan Rubber Mfg. Div.
Mason-Neilan Regulator Co.
Mattheson Alkali Works
Mattison Machine Works
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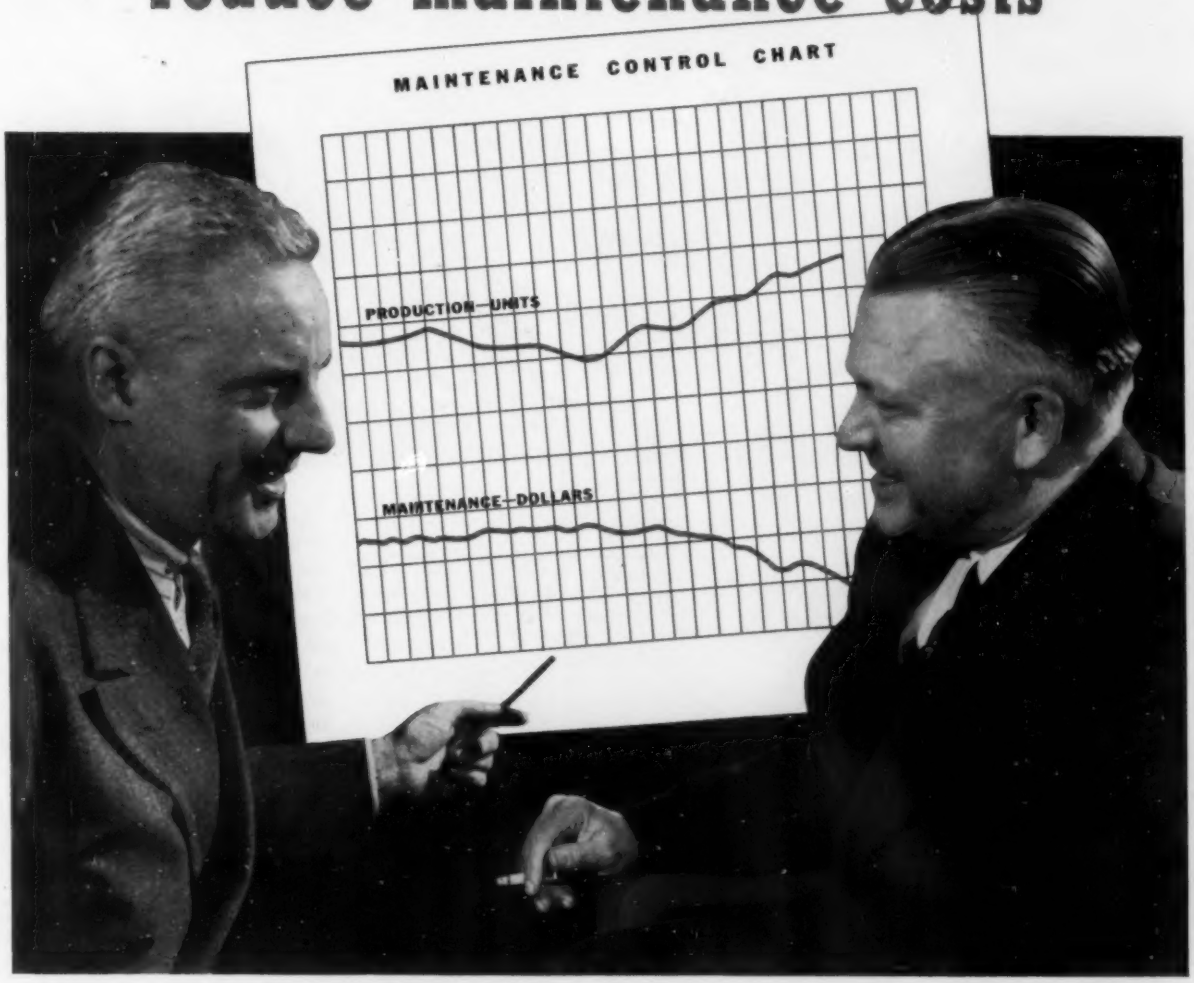

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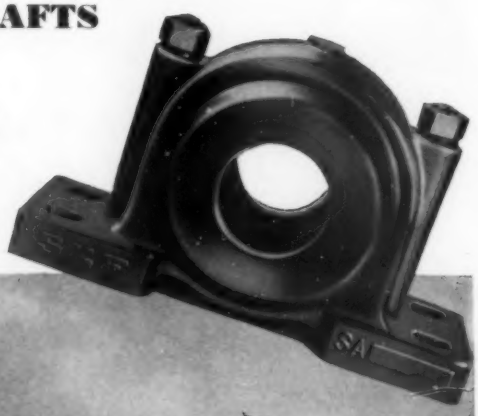

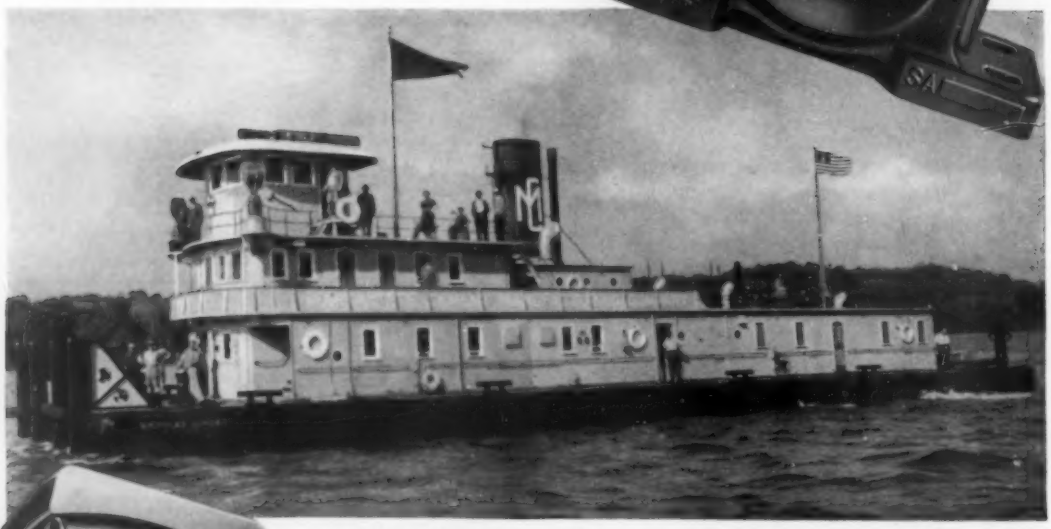

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PAMPERING PEOPLE DOES NOT HELP

AT THE RECENT annual convention of the National Lime Association we listened to a Chicago University professor tell in woe-begone accents how miserably the employers in American industry had failed to solve the fundamental problems of workers' unrest. Our present industrial system, he said, was the most completely unsatisfactory of any time; workers were never so dissatisfied as today! The cause of all this? In a social sense, we have failed in the effective utilization of human resources. We have neglected to recognize that work is a way of life as well as a source of livelihood. There is a conflict between the engineering definition of efficiency and the cultural definition; we have leaned too much to the engineering side, etc., etc. The good professor then dwelt at length on the workers' feeling of nonentity because of our era of specialization and interdependent system of production and manufacture; on how the average worker feels himself to be but a 1/50,000,000th factor in the scheme of things; how he must be made to think of himself as important.

Somehow or other, regardless of the good intentions of the professor and the truth of some of his conclusions, that sort of lecture leaves us cold. While this particular professor assured his listeners that he was *not* a New Dealer, his views have a very familiar ring. They have that familiar ring because they are the views commonly held and promulgated by those who lead cloistered lives. Their ideas of industry and "workers" are gathered largely from reading about or observation of automobile assembly lines, or from "Grapes of Wrath" books and movies. In short, they don't realize that the job of the average American worker is not much different from that of his father or his grandfather. It is no different at all in that it must supply the where-with-all to live.

It's just too darn bad we can't all eat, wear warm clothes and live under a good roof without work, or work that is always pleasant. Then we could devote *all* our time to culture, whatever that may be. Incidentally, we know a lime manufacturer who is, or was, particularly socially minded. He decided it was the right thing to give all employes vacations with pay; obviously very desirable from a social angle! Those who were used to vacations did as most every one else does; they tore around the country, seeing things, or at least thinking they saw them. Most of the "workers" however went home and had a week's spree, making themselves a general nuisance to their wives and to the community.

Well, what does that prove? That, truly, "work is a way of life," and the only way of life that a great many people know or even want to know, or the only way that it is good for them to know. The intellect of the professor and the intellects of some of those whom he spends so much time and energy worrying about are differently constituted. Some people work because they had rather work than not; some people work because they know they would starve if they didn't. We can't believe that culture appeals much to the latter, in spite of the professor's solicitude for them. It ought to be obvious that culture can't be acquired without discipline of body and mind; and work is discipline.

The professors (New Deal and other uplifters) want to make the job of cleaning out the privy attractive to the poor working man, because they shudder at the thought of doing it themselves. But the "poor working man" cleaning out the privy may be quite happy in his work because he is anticipating the "poke chops" that will be waiting for him when he gets home. We can't help feeling that the views of social uplifters like these are an important factor in making "the workers' unrest" with all work; that it is ingraining in all of us a desire to accumulate, or "distribute," wealth without exercise of the one thing that makes wealth possible—namely work and more work.

They speak in doleful tones of the pioneers who settled and built America, and lament their passing. The chief thing that made the pioneers different from us was that they didn't ask anyone, least of all the Government, to find work or "make work" for them. Damn it, they saw plenty of work to be done, and "they done it," and were happy in its accomplishment. They cleaned out privies and did a lot of other things that were not cultural, but they founded an American culture of individual independence and freedom of thought and freedom of enterprise.

We can't believe that work, any kind of work that is honest and conscientiously done, ever kept anyone from acquiring culture. Culture was not given us by rich men's sons who never had to work, or by men who became college professors to tell us about the horrors of being only 1/50,000,000th of the scheme of things. Culture was acquired and passed on to us by men who wanted it and worked for it.

The professor's philosophy was clearly demonstrated in the ten rules he gave for dealing with workmen. Some were good, but they included: (1) postpone decisions; (2) never "stick your neck out;" (3) discuss things (presumably endlessly). How far would a busi-

ness executive get who avoided making decisions wherever possible? How far would he get if he didn't stick his neck out occasionally? One speaker said afterward, "I believe in sticking my neck out; otherwise how shall I know if there are any obstructions?"

The professor said his was "the democratic way." It certainly is the way of New Deal democrats; and their philosophy threatens our national existence. Decisions and action can be dodged a long time in politics, but they can't be dodged in business and industry. We hope they will always be made rightly, by men of liberal mind and culture, but right or wrong they will be made. Therein lies the fundamental cause of much animosity between our present government, or rather governors, and business leadership. The philosophies they actually practice are as far apart as the poles. Yet both have some good points.

Nathan C. Rockwood

RESEARCH AND SALES OFFER OPPORTUNITIES

Says J. Rutledge Hill, Past-President, National Sand and Gravel Association, in this Guest Editorial

FRANKLY, your letter has put me to thinking along some lines which I had not thought of previously; and I will say that it has been interesting to canvas my own thoughts on opportunities for young men in this industry.

An outline of my ideas of the qualifications for young men who will one day fill executive positions in industry follows:

J. Rutledge Hill

By all means college graduates will be preferable, and those specializing in engineering would certainly come first. I would say that a thorough knowledge of chemistry would be essential: an elementary knowledge of business management would also be desirable, and probably very necessary. The subject of psychology has been sadly neglected in the education of all of us old-timers, but I hope it is not being neglected for the young men coming on. Some of us have made extensive studies in psychology, and my opinion is that it is most important in the conduct of a business.

Under modern conditions, I would say that sales work would be a better start for training than operating work. In our industries operating procedure, technique, and detail have been very much simplified, and there seems less opportunity for improvement along operating lines than in sales work.

Prospects for young men in our industries seem to me to be bright, indeed, along sales lines and research lines, particularly having to do with new and extended markets. In the operation of our business, we stumble across some new use for our materials quite often. I believe that if we would devote more time to this feature, and that if we would support financially, a greater and broadened research program, we would benefit very much from it.

I would say that research in our industry is being and has been sadly and woefully neglected. It is hoped that this condition can be overcome soon with the realization by the members of the industry of the importance of this work.

My advice would be to those men whose sons show promise along sales lines that they start the boys in on sales work. This work is most instructive and opens up a "treasure chest" of vital information to the young salesman, especially so if he is alert mentally and can grasp the application of facts, accidentally gathered, to the solution of his own and employer's business.

The unions are on the way *out*, and I would say that we need not worry about the effect of membership in them on young men who are capable of becoming executives. A young man determined to go somewhere in business and in life, knowing where he wants to go, and concentrating on his objective with all his efforts, cannot be denied; he will surely get there.

This is still the good old U. S. A. and people haven't changed much except in the "no ambition" group. The same or larger opportunities exist as in years past, and the young man of today has a fine chance of going just as far as he sets out to go and just where he sets out to go. There still is no substitute for integrity, industry, and tenacity.

Making "Prescription Sand" At 50 Tons An Hour

Plant blends four classified fractions to strict asphalt sand specifications

By W. B. GERY*

THE LARGE SAND PREPARATION plants that were built to supply high specification sand for the Boulder and Grand Coulee Dams represented a forward step in producing top grade concrete sand from local deposits of heterogeneous composition. As reported in articles in ROCK PRODUCTS (Boulder Dam, August 27, 1932, pp. 7-17; Grand Coulee Dam, March, 1936, pp. 30-43, and January, 1939, pp. 34-37) the final screen undersize in both cases was divided into a number of closely sized fractions by mechanical classifiers and these fractions then recombined in the correct proportions to give a final blended sand of the fineness modulus specified by the Federal engineers. Both of these plants operated at capacities in excess of 1000 tons per hour and during their useful lives turn out an unvaryingly uniform sand equivalent to about 50,000,000 cu. yd. of concrete.

Engineers were generally agreed that a new high point in advanced technique had been set at the Boulder and Grand Coulee sand preparation plants. Still many were also of the opinion that such elaborate processing methods, while perfectly feasible for 1000 tons per hour, could not be applied practically or economically on the more moderate operating scale common throughout the industry. Hence this article describes how a producer with a similar problem in fineness control, applying the lessons learned at the Boulder and Coulee Dams successfully to a 50 ton an hour plant, makes high specification asphalt sand.

TABLE 1

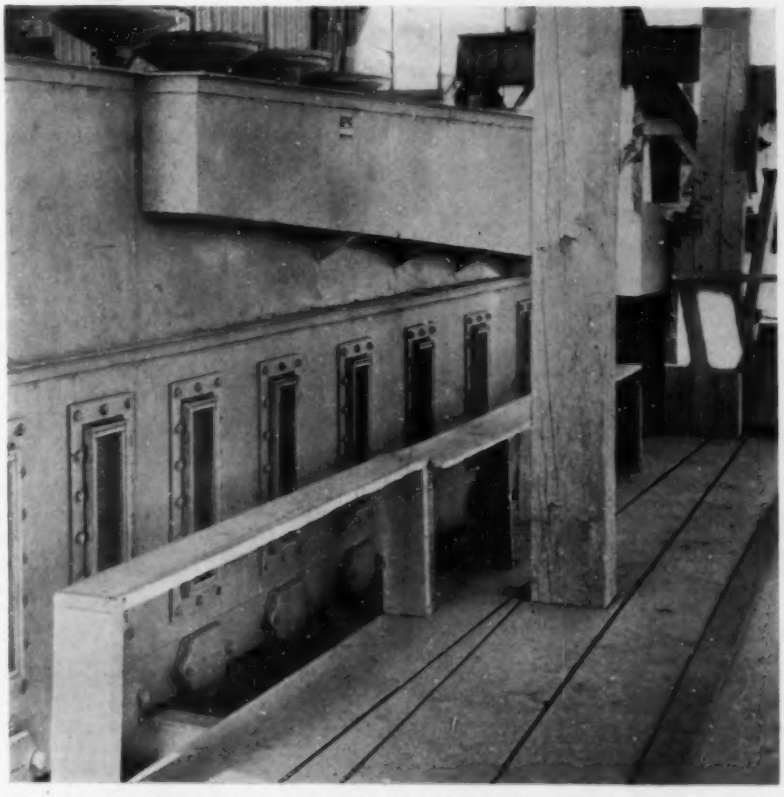
Coarse	—8- + 40-mesh —32 percent
Medium	—40- + 80-mesh —42 percent
Fine	—80- + 200-mesh —26 percent

The producer had been making asphalt sand for a number of years at an existing plant, but had reached a point where it was becoming more and more difficult to meet the stricter asphalt sand specifications set by the largest consumer of its products.

The sand which the producer desired to make in this new plant required it to have a very definite distribution of coarse, medium and fine grains. Table 1 above shows the model specification set up.

A number of sand deposits were investigated. The particular deposit chosen was sampled by means of test holes and portions taken from the face. Table 2 which follows shows the size distribution in this pit after the removal of gravel and fine material passing a 200-mesh sieve.

In Table 2 on the next page, it will be noted that "test hole" sample No. 6 very closely approximates the "model" specifications set up in Table 1, and that this sample would probably be acceptable as it stands, without any further treatment. On the other hand, it will also be noted that the other "test hole" and "face" samples not only diverge sharply from the "model" specifications, but also that there is a wide variation in size distribution from sample to sample. Broadly, however, it can be said that the pit as a whole is deficient in grains between 80- and 200-mesh and



Fahrenwald sizer produces eight separate fractions later sent to four classifiers

* Engineer, The Dorr Co., Inc., New York City.

TABLE 2

Test Holes	Percent —8- + 40-Mesh	Percent —40- + 80-Mesh	Percent —80- + 200-Mesh
No. 1	41.6	37.6	20.7
No. 2	49.6	30.9	19.5
No. 3	47.2	33.0	19.8
No. 4	28.1	24.5	47.4
No. 5	39.0	39.4	21.6
No. 6	33.6	42.5	23.9
From Face			
No. 1	31.4	35.9	32.7
No. 2	28.6	31.6	39.8
Model	32	42	26

between 40- and 80-mesh and is too abundantly supplied with grains in the 8- to 40-mesh range.

Basis of Plant Design

After considering the foregoing, it was clear that the only feasible method of treating this deposit was to split the raw, run-of-pit sand into three fractions—first, an 8- to 40-mesh fraction, then a 40- to 80-mesh one and finally, one lying between 80- and 200-mesh. Once the raw sand was thus fractionated into three grades, the desired blend, as covered in Table 1, could be made readily by recombining these three grades in the exact proportions required.

This line of reasoning naturally suggested an application of the fractionating and blending principles, so well demonstrated on a large scale at the sand preparation plants of the Boulder Dam and the Grand Coulee Dam. However, there was one other requirement to be met—namely that the producer wished to make the plant extremely flexible, in anticipation of possible future changes in asphalt sand specifications and also in anticipation of the probability that in the future they might wish to make high grade sands other than asphalt grade. For these reasons, it was decided to make four fractions rather than three and to make an additional split at 20-mesh, so that the following four products could be stacked prior to blending: 8- to 20-mesh, 20- to 40-mesh, 40- to 80-mesh and 80- to 200-mesh.

The primary objective of the plant was to produce not less than 40 tons per hour of top specification asphalt sand. This, it was concluded, would be equivalent to an average feed of raw sand of 50 tons per hour.

Flowsheet and Equipment

Fig. 1 shows diagrammatically the flowsheet and equipment adopted to meet the conditions enumerated above. Run-of-pit sand containing a certain amount of gravel is deposited in a 10-ft. x 10-ft. concrete feed hopper, which discharges via a belt conveyor to a double washing trommel. Two grades of gravel—one +1½-in. and the other —1½-in. +¼-in.—are discarded to waste and a —¼-in. sand plus the wash water run over an 8-mesh vibrating screen to remove as a reject product sand —¼- in. +8-mesh. The —8-mesh undersize flows from the vibrating screens to two 10-ft. diameter dewatering cones which overflow excess water, clay and slimes to waste and discharge a thickened sand product to the fractionating plant.

Up to this point the treatment process is conventional and follows the lines well established for years in the sand and gravel industry. For this reason, it appears unnecessary to dwell at length on the equipment employed or the operating practices followed. After all, this article is concerned with the next stage of processing—namely, the fractionating of the —8-mesh sand into four products for subsequent recombination and blending, to meet the specifications set.

The underflow from the two 10-ft. dewatering cones enters the feed end of an eight-compartment Fahrenwald sizer. The Fahrenwald sizer, a hydraulic classifier widely used in metallurgical practice, is a unit operating on the hindered settling principle, which produces from a heterogeneous feed eight separate and distinct fractions, varying according to their hindered settling rates, which in turn are proportional to the sizes of the grades. Referring to the flowsheet, the coarsest product is discharged from pocket No. 1, the finest from pocket No. 8 and intermediately-sized products from the intervening compartments, 2nd to the 7th inclusive. The very finest material overflows the end of the Fahrenwald sizer with the bulk of the water.

Four Dorr classifiers are provided for dewatering the combined discharges from various compartments of the Fahrenwald sizer, as shown.

The products from compartments one and two of the Fahrenwald sizer are dewatered in No. 1 Dorr classifier, the products from compartments three and four in No. 2 Dorr classifier, the products from compartments six, seven and eight in No. 3 Dorr classifier; and the Fahrenwald sizer overflow, after classification in a 15-ft. dia. bowl, is dewatered in No. 4 Dorr classifier. Each classifier discharges a dewatered sand product to a stock pile—one pile for each of the four classifiers.

This arrangement permits great flexibility. In the first place, the hydraulic water introduced in the Fahrenwald sizer may be varied at will, thus changing the size distribution of the products discharged from the different compartments. Secondly, any of the eight compartment products may be combined with any group

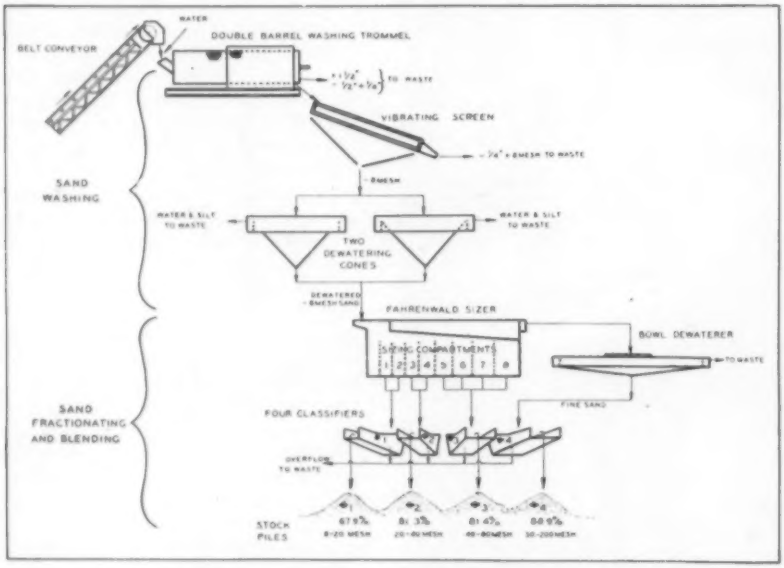


Fig. 1: Flow sheet of plant designed to make a closely graded asphalt sand

Eastern asphalt sand plant, showing from top to bottom, revolving screen, dewatering cones, the sizer and four classifiers

of other compartment products and rerouted to different classifiers, thus altering the distribution of sizes sent to the four stock piles.

A grab bucket is set up with a 100-ft. boom. This enables the operator to pick up the products from the bins that receive the four classifier discharges and to distribute these products in a circular arrangement to four stock piles. In preparing orders for asphalt sand or other set grades, this same grab bucket will be utilized to deliver the desired amount of each fraction to blending bins, thus making it possible to produce practically any blend of sand containing grains lying between 8- and 200-mesh.

Operating Data

Table 3 and Table 4 below give the screen analysis of the feed to the Fahrenwald sizer and the screen analysis of the product discharged from the eight compartments and from the four Dorr classifiers. They should be studied in conjunction with Fig. 1, the flowsheet, which shows the flow of material through the plant when these data were collected.

Referring again to these tables, a number of interesting points will be noted as follows:

No. 1 Classifier product contains 67.9 percent of material 8- to 20-mesh and 98.5 percent of material 8- to 30-mesh.

No. 2 Classifier product contains 81.3 percent of material 20- to 40-mesh.

No. 3 Classifier product contains 81.4 percent of material 40- to 80-mesh.

TABLE 4. DORR CLASSIFIER PRODUCTS

Screen	No. 1 Classifier Percent	No. 2 Classifier Percent	No. 3 Classifier Percent	No. 4 Classifier Percent
—4- + 8-mesh				
—8- + 10-mesh	4.7			
—10- + 16-mesh	27.1	0.5		
—16- + 20-mesh	36.1	3.2	0.1	
—20- + 30-mesh	30.6	23.5	1.1	0.1
—30- + 40-mesh	1.0	57.8	13.9	0.1
—40- + 50-mesh	0.1	13.7	47.0	3.3
—50- + 80-mesh	0.1	0.2	34.4	32.5
—80- + 100-mesh	0.1	0.7	3.1	20.8
—100- + 200-mesh	0.1	0.2	0.3	35.6
—200-mesh	0.1	0.2	0.1	7.6

No. 4 Classifier product contains 56.4 percent of material 80- to 200-mesh and 88.9 percent of material 50- to 200-mesh.

The blending of these four fractions in the correct proportions has enabled the producer to make a highly satisfactory grade of asphalt sand which meets or exceeds the specifications set for the plant. It has produced this from the start of operations and in addition has produced an excess of No. 2 Classifier product which has found a ready market locally as "filler" sand.

From the standpoint of flexibility, compactness and ability to produce a wide variety of accurately graded, high specification sand, this plant is believed to have set a new standard for operations of this scale of magnitude. It represents another step forward in the direction of applying improved methods to the sand industry's new problem of meeting stricter specifications and has demonstrated that the principles and practices used on large scale projects can be applied successfully and economically on a scale as low as 50 tons an hour.

TABLE 3. FAHRENWALD SIZER PRODUCTS

Screen	Feed Percent	No. 1 Compt. Percent	No. 2 Compt. Percent	No. 3 Compt. Percent	No. 4 Compt. Percent	No. 5 Compt. Percent	No. 6 Compt. Percent	No. 7 Compt. Percent	No. 8 Compt. Percent	Overflow
—4- + 8-mesh	0.7	8.5	0.5							No Samples Taken
—8- + 10-mesh	1.5	12.8	1.1	0.1						
—10- + 16-mesh	6.2	50.6	20.4	3.1	0.2	0.1	0.1			
—16- + 20-mesh	5.2	22.5	37.2	13.8	2.2	0.8	0.3	0.2	0.1	
—20- + 30-mesh	9.8	4.5	38.1	42.9	22.1	19.0	1.9	0.2	0.1	
—30- + 40-mesh	19.9	0.4	2.2	36.2	59.4	61.4	28.4	10.5	0.6	
—40- + 50-mesh	22.2	0.2	0.1	1.3	14.8	18.0	59.3	67.1	23.4	
—50- + 80-mesh	14.3	0.1	0.1	1.9	0.2	0.1	8.9	18.1	65.6	
—80- + 100-mesh	7.4	0.2	0.1	0.5	0.7	0.4	0.9	3.5	9.1	
—100- + 200-mesh	9.2	0.1	0.1	0.1	0.2	0.1	0.1	0.2	1.0	
—200-mesh	3.6	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1	

Studies of Quarry Drilling

Bureau of Mines progress report delves into the relative efficiency of hammer and churn drills and methods of overcoming drilling difficulties

ANOTHER progress report (R. I. 3502) on their studies of quarry operation, by J. R. Thoenen and E. J. Lintner, has recently been issued by the Bureau of Mines, U. S. Department of the Interior. Previous reports were on shovel loading and haulage at these same 21 quarries (ROCK PRODUCTS, March, 1940, pp. 44, 45 and May, 1940, pp. 41, 42). The present report deals with primary drilling only.

The method of analysis is similar to that employed in the investigations of shovel loading and haulage. In some instances the time of taking records and making observations was only part of a work shift, in others a full shift, in some the time required to drill a single churn-drill hole. A considerable part of the report comprises definitions of various kinds of drilling, etc.

Factors Affecting Drilling Efficiency

The authors list factors that affect drilling efficiency as follows:

"(1) *Adverse conditions due to other quarry operations or processes.* These are beyond the control of the drill runner and are the responsibility of the quarry management; for example, time lost while other holes are being blasted in the quarry, power is off, or while waiting for sharp bits or other supplies to be delivered to the drill.

"(2) *Operating conditions.* These include conditions imposed by the physical characteristics of the rock in its natural state, such as hardness, toughness, texture, and resistance to abrasion; and stratigraphic conditions, such as bedding planes, joints and fissures, faults or brecciated areas, mud seams, or open voids. These are all natural conditions primarily beyond the driller's control but nevertheless within his sphere of influence because from his past experience he knows how to combat adverse conditions from these causes when they arise. Joint planes or fissures in a hole may cause the cutting tools to follow the line of least resistance and change the direction of the hole from a straight line. A crooked hole ensues, in which the drill tools are likely to bind or stick and thus prevent rapid drilling or stop it entirely. Under such conditions, it is common practice to remove the drill tools and drop hard boulders or even cast-iron scrap into the hole. When drilling is resumed, these hard objects are forced by the bit into the crooked portion of the hole while the drill bit reams the hole back to a straight course. When this remedy fails, it may be necessary to lower a charge of high explosive into the hole to the point of deviation and blast. This usually pulverizes enough of the sides of the hole to permit the bit to continue in a straight line.

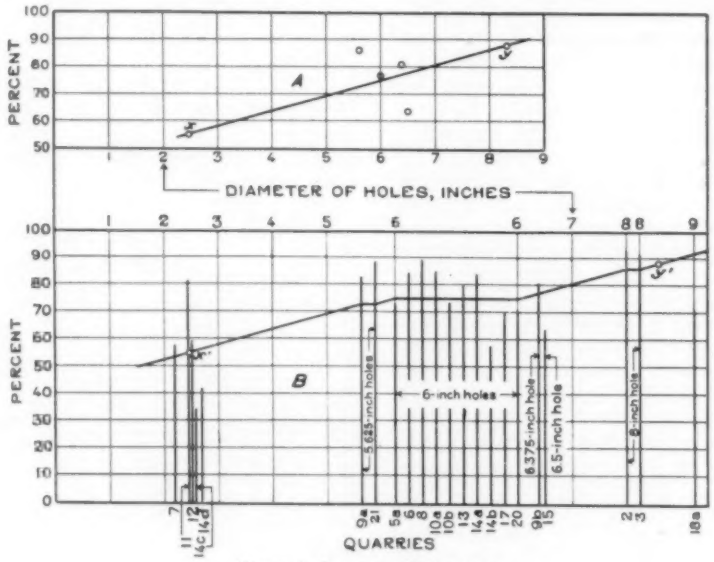


Figure 1.—Over-all efficiencies.

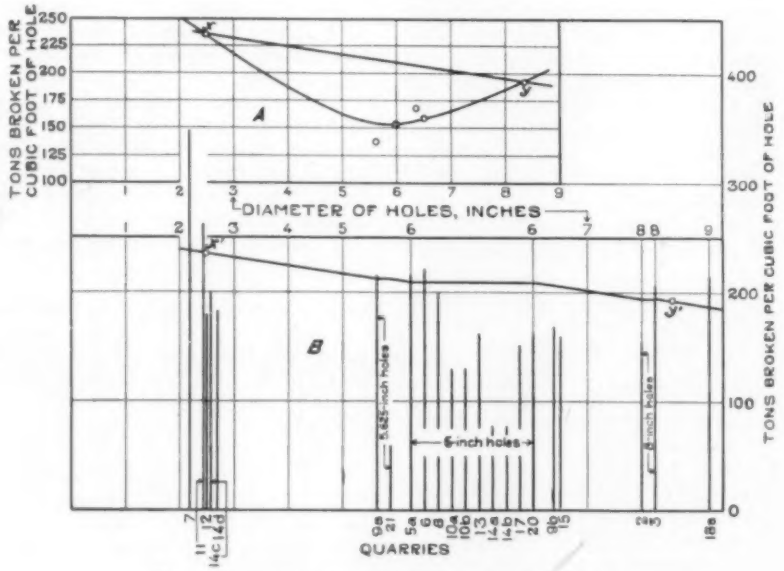


Figure 2.—Tons broken per cubic foot of hole drilled.

Obviously, the experience of the driller is of primary importance in meeting problems under such conditions.

"Similarly, open fissures, mud seams, or brecciated areas may cause trouble from raveling. Loose pieces falling from the walls of the hole drop to the bottom and wedge behind the bit, reducing drilling speed or causing complete temporary stoppage. In such event, frequently sticky clay or a mixture of clay and straw is introduced into the hole and forced into the walls by the drill tools, thus holding loose particles in place. Again, the driller's past experience is a factor in maintaining drilling speed.

"There is another type of operating delay that reduces drilling progress, but the extent of delay is largely under the control of the operator. Thus, the time required to tear down, move, and reassemble the drill over a new hole may range from a few seconds in the case of a wagon drill operating on a smooth flat bench to an hour or more for moving a churn drill over rugged terrain and cribbing up under the chassis.

"(3) *Runner delays.* In this group are delays due to interruption of drilling while the drill itself is being lubricated or while adjustments are being made on the machine, such as rearranging the drill cable on the drum of a churn drill or aligning the hammer drill in a crooked hole. Replacing a broken cable is also placed in this group.

"In addition to the delays mentioned, this group includes time lost through negligence of the drill runner.

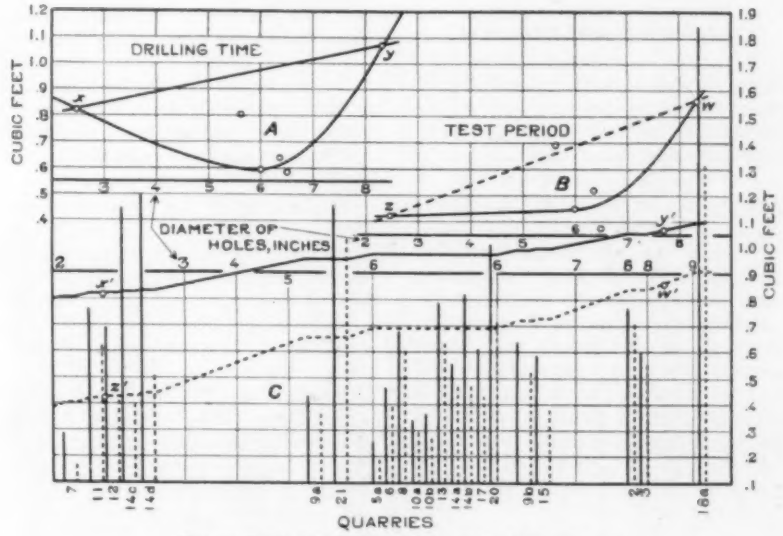


Figure 3.—Cubic feet of hole drilled per hour.

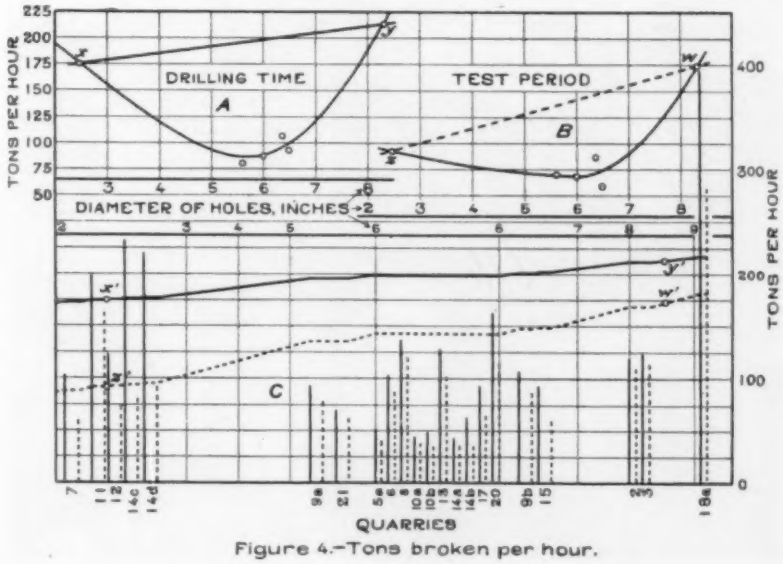


Figure 4.—Tons broken per hour.

"The authors realize that the scope of the tests is open to criticism at several points. However, the quarries at which tests were conducted are typically operated crushed-stone quarries. Not enough tests were made, perhaps, to warrant drawing definite conclusions. It is believed, however, that the summation of results obtained and trends indicated will be of value and is worthy of critical study by operators. The criticism may be advanced that the possible effect of the hardness or toughness of the stone on drill performance has not been mentioned. This point has not been avoided, but the data at hand do not warrant direct comparisons. Much research has been done in this direction, but more is needed before intelligent determinations can be made. So-called hard and soft rocks are scattered indiscriminately through the curves.

Conclusions

"However, fully cognizant of the difficulty of drawing conclusions for wide application from the tests made, the authors feel it worth while to point out that the tests recorded at these 21 quarries indicate that hammer drills as a group

"(1) Operate at lower efficiency in point of time consumption than churn drills.

"(2) Break more rock per volume of hole than churn drills.

"(3) Cut a greater volume of hole per hour of drilling time than churn drills of intermediate size but less than large drills.

"(4) Cut less volume of hole per hour of shift time than churn drills.

"(5) Break more rock per hour of drilling time and shift time than churn drills of intermediate size, but less than large churn drills.

"Individual tests scatter widely and may reverse any of the preceding five points.

"Churn drills in the group near 6 in. in diameter:

"(1) Operate at slightly lower time efficiency than larger churn drills. (This difference may be due entirely to small sample.)

"(2) Operate at higher time efficiency than hammer drills as a group.

"(3) Occupy a position intermediate between hammer drills and larger churn drills in rock broken per volume of hole drilled.

"(4) Drill greater volume of hole than hammer drills during shift time and less than larger churn drills.

"(5) Produce less rock per hour than hammer drills or larger churn drills."

Built of Concrete

Under bins may be seen walkways for truck drivers and pipe to drain off water at chutes

PERMANENCE and freedom from vibration were built into the Saticoy Rock Co.'s newest plant near El Rio, Calif., by using reinforced concrete construction and suspending the principal moving equipment from cables. A glance at the plant makes one wonder why so many producers recommend concrete construction for others and yet so seldom use it themselves. J. C. Buckbee, J. C. Buckbee Co., Los Angeles, Calif., designed the plant. Mr. Buckbee has been a director and consulting engineer of Saticoy Rock Co. since 1934.

Conveyor Permits Part of Plant to Operate Independently

Aside from the reinforced concrete bins, columns and superstructure over the bins, the belt conveyor system bringing in the pit material is of interest. It consists of two 24-ft. belt conveyors, one from the crusher pit, and a second up to the screening plant so designed that material may be transferred directly from the first to the second or it may be dropped into a live storage pit for later reclaiming by belt. This is merely a different way of accomplishing the same results that other plants have done in providing surge bin storage for unfinished material.

By having this arrangement, the plant is divided into two units; either the screening plant or the pit and primary crusher may operate without the other. In the event of a breakdown at either end, the other half of the plant can be operated.

El Rio, in the valley of the Santa Clara River near Ventura, Calif., has a deposit made up of sand, gravel and some boulders laid down by the action of water. Seasonal rains have their effect in getting out the material because they markedly influence the level of the subsurface water. During the dry summer season it is possible to work lower levels close to the river, down to about 65 ft., by dragline and trucks, but when the rains come excavation is limited to a depth of 35 ft., using locomotive haulage. About 60 percent of the pit run material is minus ½-in. and 20 percent plus 3½-in., with a few boulders.

Screening and Crushing

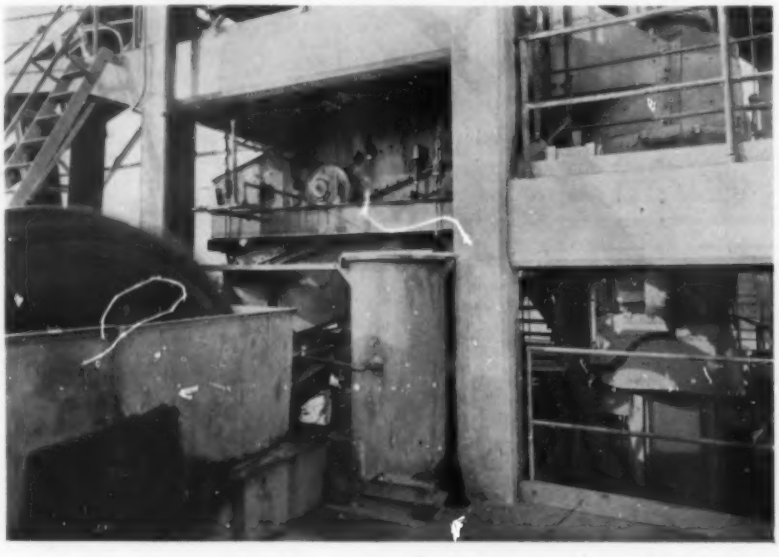
In either case excavation is done by a crawler-mounted, gasoline-powered, Northwest dragline with 1½ cu. yd. bucket. A 7-ton Plymouth gasoline locomotive hauls two cars carrying 10 tons each to a hopper over the crusher pit, or 10 tons to the trip are hauled in trucks. The 50-ton circular hopper, which has its top flush with the ground, feeds out to the primary crusher. Rails straddle the hopper for car delivery, where the car side gates are automatically opened by a spread device. In loading cars, boulders over 10 in. are rejected in the pit by a flat grizzley that is tilted to dump by dragline. This is done instead of hauling them to the crusher where they would be rejected and allowed to accumulate.

From the hopper, a 36- x 60-in. Stephens-Adamson reciprocating feeder puts the material over a sloping grizzley which by-passes the fine material and puts plus 3½-in. stone through a 14- x 38-in. Alloy Steel Foundry Co. roller-bearing jaw crusher. Crushed and by-passed material join on the stacking belt which has a lift of 1:3 on 146 ft. centers. This belt transfers to another on 130-ft. centers to the plant or drops the material into storage. In this case the second belt is not running, and the material overrides the side guides. Live storage at this point, in a pit converging at the bottom, is almost 800 tons, which is reclaimed by a 36- x 60-in. Stephens-Adamson reciprocating feeder to a 24-in. belt conveyor, 136-ft. centers, that transfers to the main belt at the primary crusher.

At the head of the screening plant, the top belt discharges over a 4- x 8-ft. Stephens-Adamson 2-deck, scalping screen. Ordinarily, a plus 3-in. stone is taken off for reduction through a 7-in. Allis-Chalmers Newhouse crusher and then elevated by a short belt bucket elevator into a distribution box to be sent to the crushed-gravel screen or it is sent to the gravel washing screen over an intermediate short belt conveyor.

The intermediate product, generally a minus 3 in. plus 1 in. gravel, is

One of the cable-suspended screens in background, reduction crusher on right and sand wheel on extreme left



For Permanence

Unusual belt conveyor system divides plant into two units; either the screening unit or the pit and crusher may operate independently of the other

View of entire plant taken from crusher pit. Note how belt conveyors are split and operate in tandem

either put through the same crusher or over the washed gravel screen. The 3-deck crushed gravel screen, of the same size and make, has a split top deck with ¾- and 1¼-in. wire cloth, ⅜-in. wire on the intermediate deck, and usually a split bottom deck to get off two fine sizes. The four coarse products drop into bins, and the fine sizes are piped into bins from hoppers. Crusher dust is stocked independently of the natural sands.

Crusher hopper showing how it may be filled by truck or railroad hopper-type cars

Throughs from the bottom deck of the scalping screen are wet-screened over a 4- x 8-ft. Stephens-Adamson 3-deck screen. The bottom deck has a section for either 4-mesh or 6-mesh cloth in producing concrete sand or plastering sand, with the other section set aside to produce roofing gravel or other fine products.

Dewatering Wheel Also Removes Clay

Concrete sand and plasterers sand are produced separately, a flume carrying either minus 4-mesh or minus 6-mesh material and water into a sand wheel dewatering machine. The sand wheel is an 8-ft. diameter wheel of skeleton steel construction with 20 steel buckets revolving on a horizontal shaft in a steel tank 4 ft. by 11 ft. in plan and 4 ft. deep.

Although the sand wheel is used principally to dewater the sand, clay is agitated and overflowed to waste, and there are adjustments for gradation control. The adjustments are the pitch of the buckets, which may be changed by re-setting pegs attaching the buckets to the links which make up the wheel. This varies the depth to which the wheel digs, and the height of the overflow weir. Each bucket has perforations to drain off water when sand is being elevated, and the buckets, after they pass the top position, spill the sand out into a hopper to bins. Overflowing the tailboard, the water containing fines and silt is piped into settling ponds. The machine occupies little space but produces 40 to 50 tons of sand hourly.

Storage capacity is 1200 tons in 12 concrete bins, four of which are partitioned, and production is about 140 tons per hour. All the vibrating screens and the reduction crusher are suspended from cables to prevent vibration and shock, and plenty of space has been left between the bins and overhead screening floor to make it easy to change chutes, screen cloths, etc.

Closed Steel Pipe Preferred to Open Flumes

Closed steel pipe, used in preference to open top flumes to convey excess water and water drained from the bins to waste, have contributed toward keeping a clean house. By building of concrete it is easy to keep a plant neat. After each day's operation it is cleaned up and swept. Hand rails, guard rails and protective guards over open drives are provided throughout to eliminate hazards to the safety of the men.

Not only are the structures permanent and practically free from maintenance expense, they are also attractive and a good advertisement for the company in building up goodwill among surrounding property owners.

Another advantage is the freedom from fire hazard which is offered by this type of construction. Even though a plant be covered by fire insurance, nothing may cover the losses in business and employes wages resulting from a fire which shuts down operations for any length of time.

All deliveries are made in company-owned dump trucks. A 500 g.p.m. deep well pump furnishes the wash water, and there is approximately 300 hp. in connected electrical power to drive all equipment. Pioneer rubber belting is used throughout. United States ball bearing motors with Allis-Chalmers Texrope are used on all drives, except for a couple of direct drives. L. C. Corser is general manager, and B. McClure is plant foreman.

Predicting Separated Sizes

Article 14 on washing and classifying sand in rising current type of classifiers describes methods of determining graphically the sizes which will be obtained

By EDMUND SHAW

PREDICTING the performance of rising current classifiers is hardly an exact science. Of necessity each material must be experimented with. Moreover, data on experience with commercial sand classifiers are sadly lacking. Certain fundamentals are helpful and these are outlined in what follows:

Fig. 1 shows two lines of points connected with broken lines. These points represent the slowest and fastest falling velocities for grains of different screen sizes, as given by Richards. The screen sizes used are now obsolete, but the diameters of the grains run from about 2 mm. to 0.15 mm., which include the grain sizes most often classified. The light vertical lines connecting points above and below represent all the grains between the fastest and the slowest settling.

The heavy dotted vertical lines have been interpolated from their diameters, which are given above the diagram. Theoretically, these connect the fastest and slowest settling grains which just pass the 10-, 14-, 20-, 28-, 35-, 48-, 65-, and 100-mesh of the standard testing sieves.

The heavy broken lines cutting through the verticals show how the rising currents of a well-designed classifier separate the sizes between the overflow and the underflow. The part above each solid line shows the portion that goes to the overflow, and the part below the portion that goes to the underflow. These lines represent results of experiments on a typical sand for a specific condition as to rising currents.

The fact that these lines are so nearly parallel proves that the sizes are divided according to some law. The fact that they are not straight lines proves that the currents meet with a resistance that is not directly proportional to the diameters of the grains. This may be due to the fact that the ratios between the diameter of a grain and its falling velocity in water vary for different degrees of fineness, as explained in Article 4 (August, 1939, pp. 65, 66).

Something like this might be used to plot classifications; perhaps a printed chart with curves of the fastest and slowest settling grains of each screen size, and separations plotted in at intervals like those given here. But this seems a clumsy method.

Methods of Plotting Sand Classifications

In fact it is not easy to find a satisfactory method of plotting separations by either screens or classifiers, which will show the proportions of the products as well as the grading of the products.

The conventional method is to plot them on the logarithmic chart, already discussed in Article 4. The same separations as those in Fig. 1 are plotted on the logarithmic chart in Fig. 2. As already explained, there are some things to be learned from

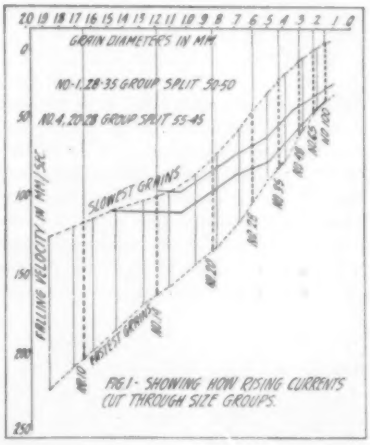


Fig. 1: Shows how rising currents cut through size groups. Heavy dotted vertical lines have been interpolated from the diameters. Heavy broken lines cutting through verticals show how rising currents of classifier separate sizes between overflow and underflow

such a plot beside the gradation of the product. But there is nothing to show from the plot of the feed what proportions might be expected to go to the underflow and to the overflow.

Years ago, while the writer was working for the Allen Cone Co., he devised a plot that showed quantities and was the basis of a method for predicting what the products would be like. Examples of its use are shown in Figs. 3 and 4, and the separations are the same (called No. 1 and No. 4) as those plotted in the preceding charts.

The feed is represented as the area of a square. The horizontal lines separate this into the size groups of which the feed is made up. The short vertical lines show where the different size groups are divided between the underflow and the overflow by the classifying current. These with the horizontals make a line that is like a flight of steps, which is lightly shaded; and this line is the division between the underflow and the overflow. Scales on the side and above

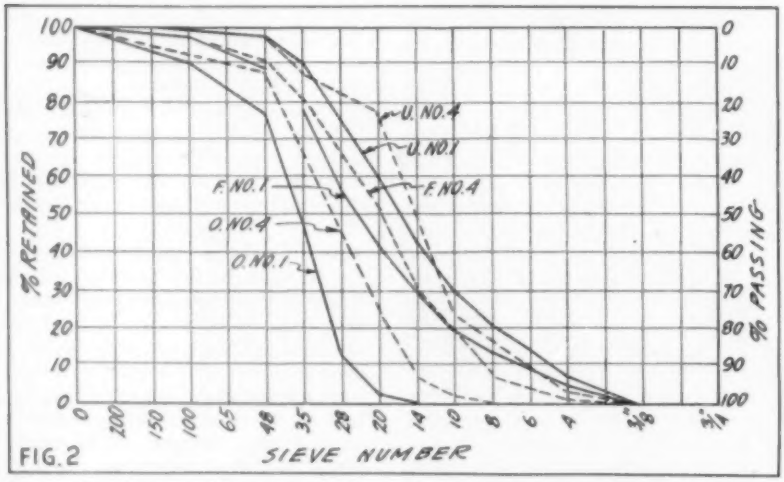
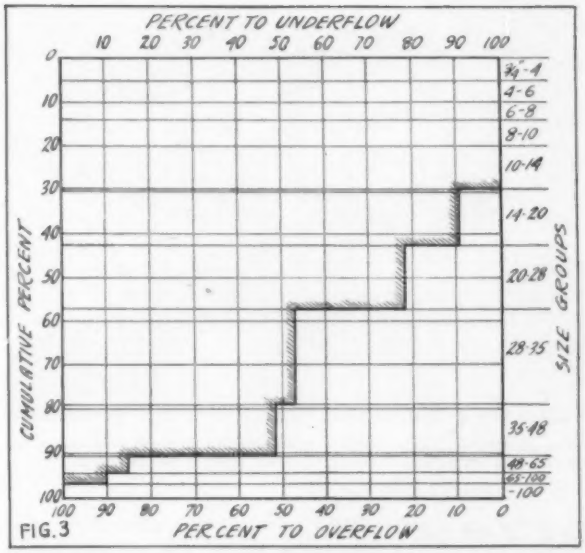


Fig. 2: Overflows, feeds, and underflows of the same separations as in Fig. 1. O = overflow; F = feed; and U = underflow



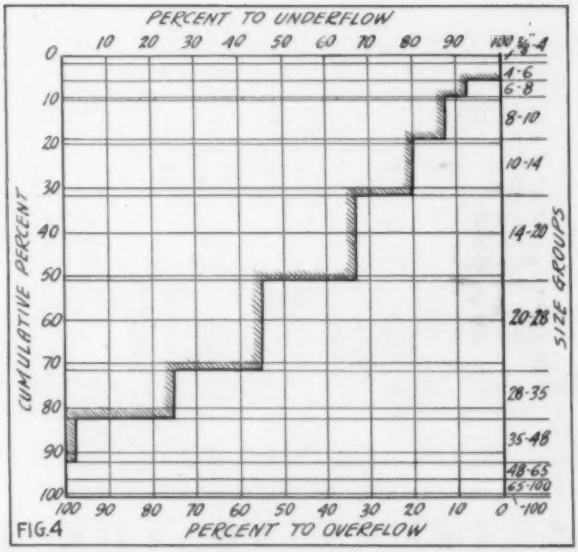


Fig. 3: Plot of No. 1 separation by areas to show quantities. The feed is represented as the area of a square; the horizontal lines separate this into the size groups of which the feed is made up. Fig. 4: Plot of No. 4 separation by areas to show quantities

and below serve to read the percentages of the various size groups in the feed and in the underflow and the overflow.

The idea was to plot in such a way that those not familiar with plotting could understand it as well as those who were, and it served its purpose. Many such plots were made, and by comparing those which represented about the same feed and the same conditions, it was possible to predict fairly well what the classification would be like with an untried feed. The method was wholly empirical, but it served to show producers about what might be expected with their material.

One fault to be found with this method is that it cannot be used to compare two classifications by plotting them on the same sheet. So recently another method was worked out so that a number of classifications could be plotted and compared It is given in Fig. 5.

Each vertical line represents a size group, and not a sieve as in the logarithmic plot. They are equally spaced, and while the distance between them does not particularly matter otherwise, the writer has made it the same as 10 on the percentage scales at the sides for the sake of having the angle with the horizontal the same in all cases. Using the scales, points are marked on these lines to show the percentage of each size group that goes into the underflow or the overflow. Then these points are connected to make the heavy lines shown in the chart. There are five of them, and No. 1 and No. 4 are the same separations that are shown in the preceding charts.

At the right a line is drawn with an angle of approximately 70 deg. with the horizontal, the angle made by the main portion of the heavy lines. A broken parallel line has been drawn through No. 2 and it cuts the size groups about as the classification cuts them.

Effect of Deleterious Material on the Classification

But one can never get away from the effects of the nature of the material on the classification, and this is well shown by these lines. The bases of lines No. 3 and No. 4 are away to the right of what they would be had they continued at 70 deg. This can only be explained by saying that the coarse size groups, 6-8, 8-10, and 10-14, had flat grains, or grains of a lighter material than the rest of the sand. Grains of lignite, soft coal, mica, shale, and dried clay would all have this effect on the separation. Of course if the classification was intended to improve a concrete sand the sending of grains of these mate-

(Continued on page 40)

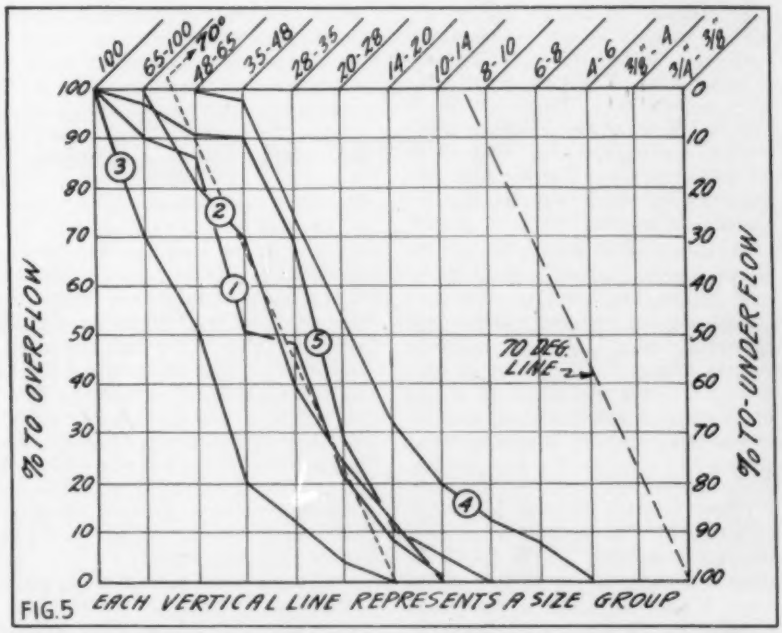
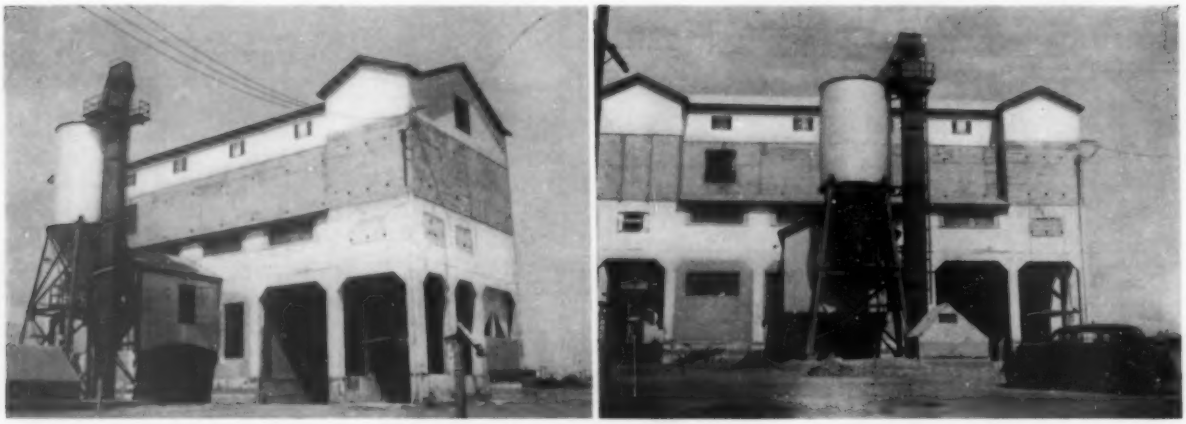


Fig. 5: How classification divides size groups of different sands. Each vertical line represents a size group. Heavy lines indicate the five separations on the preceding charts. Broken parallel line drawn through No. 2 cuts size groups like classification cuts them



Two views of new distribution plant built by Grant-Pacific Rock Co. at Fresno, Calif., which combines under one roof dispatching of batched aggregates, ready-mixed concrete, and bituminous concrete. Noble batching equipment is used

LETTERS TO THE EDITOR

"Good Screening Means Good Feeding"

THE EDITOR:

During the ten years that I have been away from direct operations in the manufacturing of aggregates a great amount of material has been written on improved practice in the materials field, and I notice that ROCK PRODUCTS has persisted in the educational policy. Our friend Shaw, though gone, leaves his mark upon us also. It is his last series of articles that prompted me to write and commend the editors of the ROCK PRODUCTS for their persistence.

In addition to Shaw's article, the March number brings Mr. Coppock and my friend Fowle from Watsonville, Calif. Mr. Coppock recites common sense and Mr. Fowle applies it. The entire set of technological processes of manufacture and methods of use of aggregates is based upon common physics, which is certainly not a speculative science.

Suppose that we look into the matter of uniform feed for screens. Common sense is supported by a few simple calculations pertaining to the area of actual screen openings and the volume of materials exposed to that area. Obviously the situation is like Main street on Saturday afternoon. If you must go down Main street you shall take your time. On a screen two pieces deep only one can get through.

I have heard a producer say "Why pick on me?" The answer is common sense plus a little arithmetic based upon test data. If, as Testing Engineer, I have designed a *Combined Mixture* for an asphalt pavement or for a concrete pavement it is presumed that the mixture is selected to be waterproof and stable. The combined mixture is tested for stability in a stabilometer or some other compression loading device and the result correlated to road service. The factors to be considered thereafter are those of delivery of materials from which the plant inspector can obtain uniformly, the same *Combined Grading*.

And why would not other mixes be just as good? The answer is that there are other mixes that will give equal service, but the testing engineer has not sampled, tested or designed other mixes and unless everyone is willing to shut down until this can be done, no change in the *Combined Mixture* can be allowed. Notice is given that it is the *Combined Mixture* and not the proportions and group gradings that fix the desirable quality. If the size composition of the separate groups of sizes is not uniform, the testing engineer will correct the proportions and maintain a uniform *Combined Mix*. Here again, though, the change in group size composition must be known in advance or the work must be delayed until the sampling, sieving and corrected proportions are determined.

The price of materials should reflect their value. If producers are not getting enough money for their materials, look into it and see if it would serve the purpose if thoroughly tested, inspected and utilized. The object of using aggregates is definitely definable. If a finished product will not be correlated with service it will reflect the existence of a "stuff market." Even quarry waste must be tested for stabilization.

After years of contact with ROCK PRODUCTS editors and readers, it seems right to say that good screening means good feeding. If anyone thinks that carelessness about things will be tolerated they do not see the future, in which aggregates and aggregate dollars will, combined with talent, stretch the few highway dollars a long way. The WPA has done away with assessment money and the gas tax collections are all fenced in with bureaucratic and constitutional provisions. Testing laboratories and testing engineers are busy. Our most frequent callers are our old friends, the construction industry. Within the past two months this laboratory has forwarded notes on low cost construction to Cleveland, New Orleans and Pittsburgh. I guess more money is a thing of the past.

STANLEY M. HANDS,
Testing Engineer,
City of Oakland, Calif.

Largest Rock Core?

THE EDITOR:

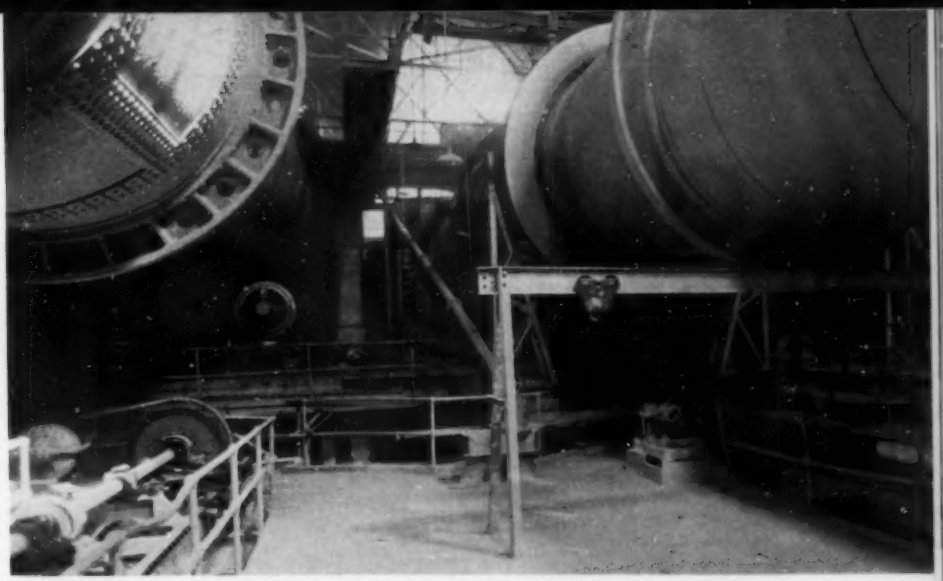
Some time ago I mailed a question to Frederick I. Haskin, as follows: "Please state the diameter, and where and by whom the largest rock core has been cut and lifted."

Mr. Haskin has not been able to give me an answer, but has referred me to you. I am interested in this question as I personally have cut and lifted rock cores as follows: In Nashville, Tenn., a limestone core 22 in. dia. and 6 ft. long; in Aurora, Ill., a 32-in. core 24 in. long. In both cases the holes were cored to a depth of 50 ft.

At Nashville the core was made for a hydraulic elevator installation, and the one in Aurora was made in the bed of Fox River to be used in testing large deep well type turbine pumps for the American Well Works. I will greatly appreciate any information you can give me.

B. L. PALMER,
441, R. D. 3,
Aurora, Ill.

Flue dust feeders are located 75 ft. from feed end of the kiln to minimize dusting. This location is where the slurry dries out and begins to coagulate into balls which eventually become clinker



Two of the wet process kilns and the feeders which put dust back into the kilns

Small Cyclonic Collectors For Stack Dust

By **BROR NORDBERG**

AT THE PEERLESS CEMENT CORP. PLANT in Detroit, Mich., about 85 percent of the dust contained in the kiln gases is being recovered at the point of entrance into the stack by new Multiclone collectors. They were installed early this year to recover and make available for return into the kilns, as a continuous operation, much of the dust which was lost when using a less efficient water spray method of collection.

Peerless has three 11- x 175-ft. Traylor kilns at Detroit, each of which is direct-fired by unit coal mills and operated under induced draft. The plant is wet process and is equipped with individual 1000-hp. waste heat boilers and B & W heat economizers.

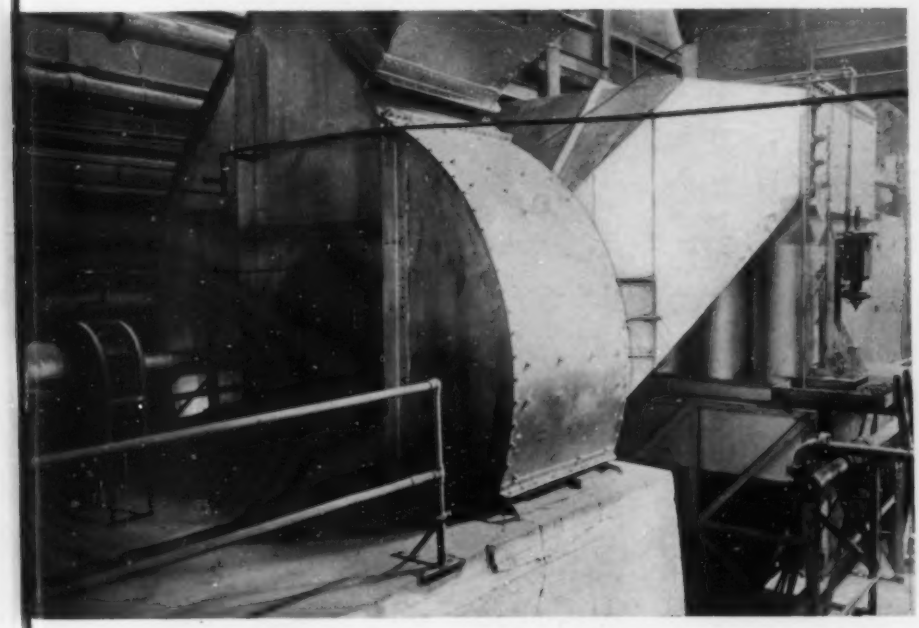
Prior to 1940 the kilns exhausted through a common steel header into a single 215-ft. stack. The air requirement was, and still is, 60,000 c.f.m. per kiln with an average output of 60 to 65 bbl. of clinker per kiln hour. Recovered dust was limited to that dropped within baffled dust chambers preceding the waste heat boilers, and the remainder of the dust was washed from the exhaust gases in the header by water sprays and wasted. Recovery was only about 15 percent of the dust. This recovered dust was returned into the slurry.

The Multiclone consists of a battery of twenty-one 2-ft. dia. cyclonic tubes furnished by Western Precipitation Co. Selection for this particular job was based on the efficiency desired, compactness, ease of installation and accessibility.

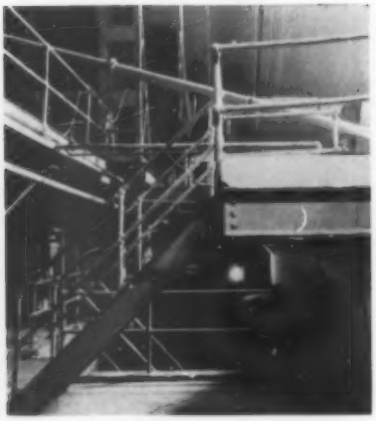
The Multiclone was fitted into a small space and placed on the floor level of the mill between the boiler economizers and the induced draft fan, operating under suction.

Prolong Fan Blade Life by Sacrificing Friction Losses

Draft for kiln operation, in each case, is developed by 9-ft. diameter Sturtevant fans powered by 200-hp. constant speed motors turning at 435 r.p.m. Frictional losses caused by pull-



Looking at one end of a battery of 21 cyclonic dust collectors with the induced draft fan on the left



Flue dust feeder in upper center around kiln shell

ing the air through the Multiclone collectors have increased the power demand 10 to 15 percent for each fan, but removal of dust ahead of the fan blades will likely prolong fan blade life four or five times. In normal production, utilizing 60,000 c.f.m. of air per kiln, the fans each require 110 hp.

How Recovered Dust Is Returned to Kilns

The efficiency of 85 percent is average, recovery depending of course upon the size, shape and density of the dust particles, kiln output, kiln draft and other factors. If the kilns are pushed to increase production, some possible increase in collection efficiency would be likely, but the 15 percent dust lost in the smaller micron sizes is not wanted for kiln feed material.

Dust-laden air enters the Multiclone at 450 deg. F. and the air temperatures at the fans is about 400 deg. F. Recovery of dust is about 20 tons per kiln in 24 hr.

All the Multiclones have air-tight, self-sealing discharges into a screw conveyor below, which conveys the dust and that dropped from hoppers below the economizers, waste heat boilers and dust chambers to an enclosed bucket elevator. Three identical screw conveyors, each serving one kiln, empty into the boot of this elevator.

In turn, the elevator empties into a single screw conveyor which, upon discharge, splits the stream into three spouts serving Minogue flue dust feeders on each kiln. These feeders are located 75 ft. from the feed end of the kiln, which is as close as the supporting trunnions and the kiln mechanism will permit their location with respect to the ideal point of feed into the kilns. The most efficient location for the point of entry into the kilns is estimated to be nearer the feed end of the kiln at the place where the slurry dries out and begins to coagulate into balls. This theoretical point would likely minimize dusting since the particles of dust would be taken up into these balls which eventually become clinker. Experience thus far has been that the dust fed back into the kilns does not disturb the mix.

Plan and elevation details of dust collector installation at Peerless Cement Corp.

Welding Contest

THE JAMES F. LINCOLN ARC WELDING FOUNDATION, Cleveland, Ohio, is sponsoring a 2½-year program of scientific study on the application of the electric arc process of welding in the furtherance of industrial development for which $200,000 will be paid out in awards. Awards are offered for studies speeding the benefits of industrial progress by improving designs, manufacture, fabrication, construction and maintenance of all types of machines, building, structures and products.

Participation in the program is open to everyone who plays any part in actually bringing about progress in the executive, design, fabrication, manufacture, construction or maintenance phase of industrial product or structural development. Authors of studies may be any persons actively engaged in the various divisions outlined.

The rock products industry was fortunate in receiving several of the awards in the last contest. Inquiries concerning the program should be addressed: Secretary, The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio.

Dry Cleaning vs. Washing

By ROYAL E. FOWLE*

Improving quality of rock from storage by the resizing and dry-cleaning method which was later changed to resizing and washing

Fig. 2: Thirty-ton locomotive crane used for stockpiling

QUARRY AND PLANTS of the Granite Rock Co., Watsonville, Calif., are located in Chittenden Pass where, due to the topography of the country, a suitable stockpile location was not obtainable closer than 4000 ft. to the main crushing plants. Fig. 1 shows the quarry and stockpile locations and the general character of the surrounding country.

It is generally advantageous either to return the stockpile material to the main plant for resizing and recleaning, or to have a special plant for this purpose built near the car or truck loading point. While it is usually desirable to use the overhead conveyor system for placing material in stockpile, and the tunnel-conveyor system for removing it from storage, such systems were not used because of the high first cost due to the long conveyors required coupled with difficulties of installation. The drag scraper storage system was not feasible for this particular problem.

An Ohio 30-ton locomotive steam crane (Fig. 2) with a 1½-cu. yd. Owens bucket is used for stockpile operations, and this equipment has been found capable of handling the unloading, loading, and switching requirements in a satisfactory manner.

Fig. 1: Airplane view showing (A) quarry; (B) crushing plant; (C) crusher run base storage; (D) crushed rock stockpiles; (E) hydraulic dam for receiving wash water; (F) hydraulic dams for receiving water from quarry hydraulicking; (G) Pajaro river

* Member, American Society of Civil Engineers; Engineer and Production Manager, Granite Rock Co.

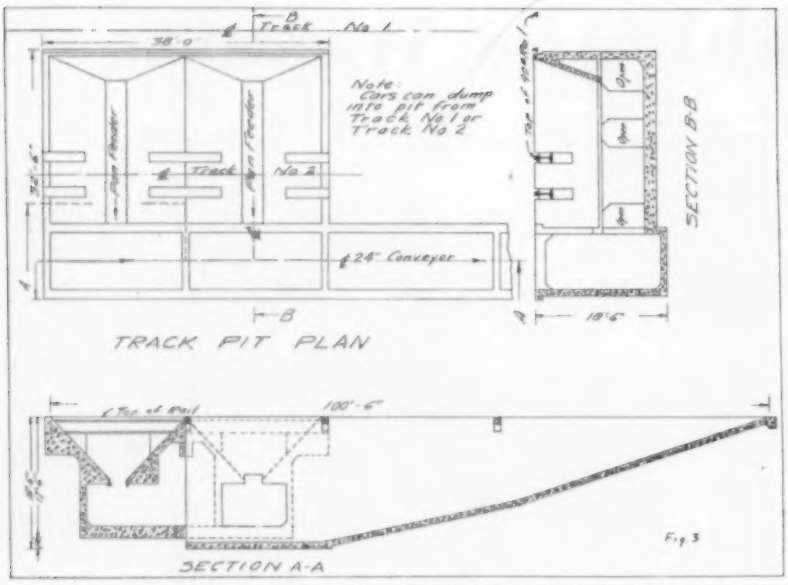


Fig. 3: Track pit plan of dry-cleaning and sizing plant received stockpiling material from air-dump cars

Crushed rock stockpiles of the Granite Rock Co. have the faults common to all coarse aggregate stockpiles; that of size segregation, and accumulated fines at their centers or cores due to this segregation, combined with the breakage and abrasion.

Need for Dry-Cleaning and Resizing

Owing to these faults, the condition and grading of the material loaded by crane and shipped direct from storage was at times not of the best so in 1931 a dry-cleaning and resizing plant was built at the stockpile location in order that the excess of fines and dust could be removed from all of the stored sizes before they entered the car as a part of the loading operation. This plant was designed with watertight chutes and dust hoppers so that it could be changed over to a wet plant more readily if the dry-cleaning operations were not entirely successful.

The dry-cleaning and sizing plant consisted primarily of a double or "W" shaped pit, (Fig. 3), of 180 tons capacity, for receiving the stockpile material from a 40-cu. yd. standard gauge Western air dump car which is capable of dumping into the pit from either of two pit tracks. The rock was then fed from both sides of this pit by two leakproof variable speed pan feeders to a 24-in. belt conveyor which discharged into the head end of a 4- x 12-ft. scrubber, Fig. 4. This scrubber was made by replacing the screen cloth of a Bodinson trommel with a ¼-in. thick A.R. steel shell. Angle iron lifters aided in churning and agitating the material being "dry scrubbed."

The discharge from this scrubber went to a 4- x 10-ft. Robins double deck screen (shown in Fig. 5); the material passing through the bottom deck going to dust bunker; the material going over the bottom deck going to (1) reject bunker, (2) railway car, or (3) truck bunker; the material going over the top deck going to (1) reject bunker, (2) railway car, or (3) truck bunker. The material from the dust and reject bunkers was loaded out to cars by means of a 20-in. conveyor. The scrubber and screen could be by-passed to send material to an asphaltic concrete plant bunker, or direct to the truck bunker.

The flow sheet of the dry cleaning plant is shown in Fig. 7. It will be noted that the plant was laid out to allow for an additional scrubber and screen in the event additional capacity was required. The average plant capacity was 180 tons per hour with a minimum of 75 tons per hour.

The stockpile plant was operated as a dry plant from 1931 to 1937, at which time the change was made from dry-cleaning to washing. The change was made so that an even cleaner material could be delivered and, in addition, the production rate could be increased. This was accomplished by the addition of washing water at the scrubber (Fig. 4), sizing screen (Fig. 5), and car loading chutes, along with the means of disposing of the wash water.

At the time the dry plant was designed, it was planned when the change was made to flume the wash water to a battery of large diked and partitioned settling basins, disposing

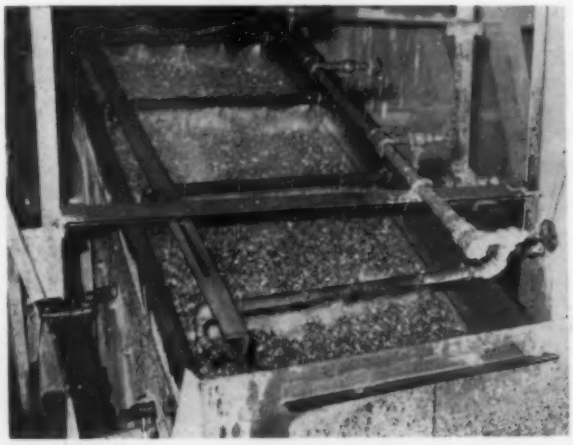


Fig. 5: Material being washed over a 4- x 10-ft. Robins double-deck screen. A ½-in. blow-off valve is placed at the end of each Link-Belt spray line to remove scale

Fig. 4: Conveyor belt takes material from track pit and feeds into 4- x 12-ft. scrubber with water added at the feed end through pipe

of the water by percolation, evaporation and drainage, removing the settled out solids by the use of a bulldozer and a clam-shell equipped crane. Owing to changes in ground areas and other conditions, this plan was abolished in favor of one utilizing a "hydraulic dam" located 50 ft. above and approximately 1500 ft. from the plant. The term "hydraulic dam" is one coined years ago at the quarry when the overburden over the granite rock dome was first removed by hydraulicking, or the use of a monitor to sluice off the sand and soil. This material is washed into natural flumes in the earth's surface to dams in canyons, or pockets, in the hills below the quarry. Here it is settled out and the cleared water sent to

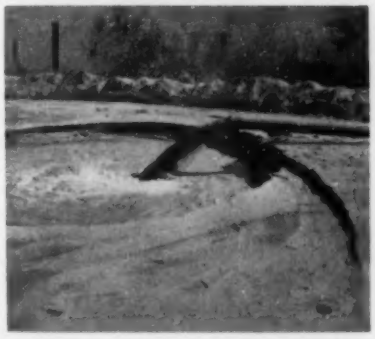


Fig. 6a, Above: Quarry hydraulicking operation. Left to right: Frank Swearington, supt., Claude Clark, track foreman, and A. J. Wilson, vice-president Fig. 6, Below: "Hydraulic dam" settles out waste material from washing operations before returning water to river

the nearby Pajaro River. These dams are built up as they fill up, as shown in Fig. 6.

Water from either washing or hydraulic operations cannot be sent to the Pajaro River without first settling out the solids, as the river water is used for irrigating farm lands. The hydraulicking operations were ably described in an article covering our entire quarry operations which appeared in the February, 1924, issue of ROCK PRODUCTS.

Dry-cleaning operations proved quite successful if the material was

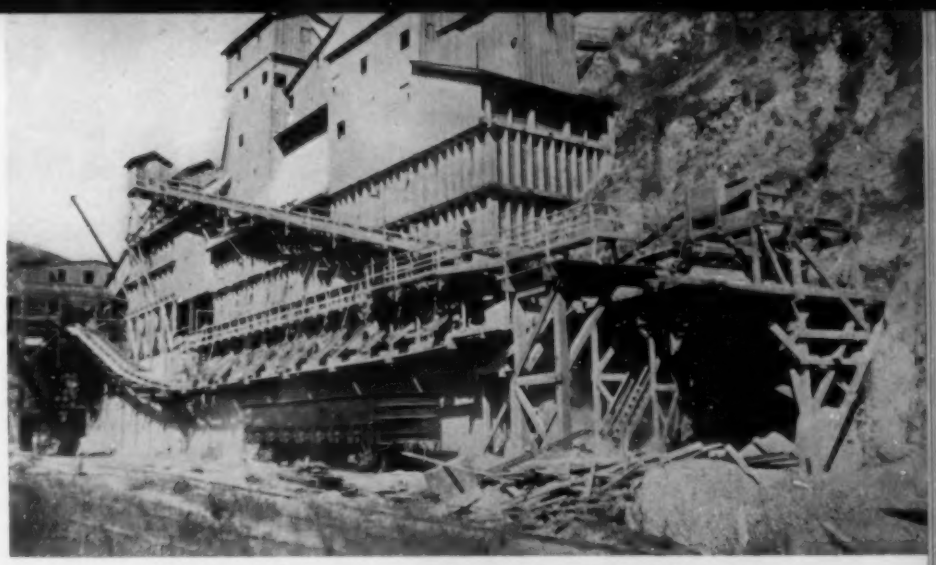


Fig. 8: Dry cleaning screen at main dry reduction plant. Photograph was taken during change over from dry cleaning to washing

dry. All of the fine surface dust adhering to the rough pitted surface of the crushed rock could not, however, be removed by this dry-cleaning as wash tests showed that the dry-cleaned rock contained from 0.25 to 2.5 percent dust. There was also a fine float dust that followed the rock into the car along with fine dust generated by abrasion as the aggregate traveled down the loading chute from the screen into the car.

If the material was damp the cleaning operation removed only the fine damp free dust and left the rock surface with a fairly heavy dust coating, which later came loose when the rock became dry. This was particularly true in the ½- x ¼-in., ⅜- x ⅛-in. and ¼- x ⅛-in. sizes of rock, as these did not dry out readily in stockpile during the dry season of the year. At times these smaller materials, of high surface area, capable of gathering much dust, would be run through the plant several times with a drying period between the "aerating" runs. These repeated operations were not only costly, but did not materially aid in further dust removal.

The dry-cleaning operations of this plant can be called quite successful as the stockpile material showed a marked improvement after being resized and cleaned. By resizing, it made possible the salvaging of material sizes that had become mixed at the junction of stockpiles. By removal of excess dust and fines, the reclaiming of material that would otherwise not have been salable, was possible. In fact, the recleaning operation was so successful that it became necessary to install a 4- x 10-ft. dry recleaning screen, Fig. 8, at the main dry reduction plant loading point so that this plant material would compare favorably with that from stock pile! This installation was ably described by Mr. Edmund Shaw in the April, 1935 issue of ROCK PRODUCTS.

(To be continued)

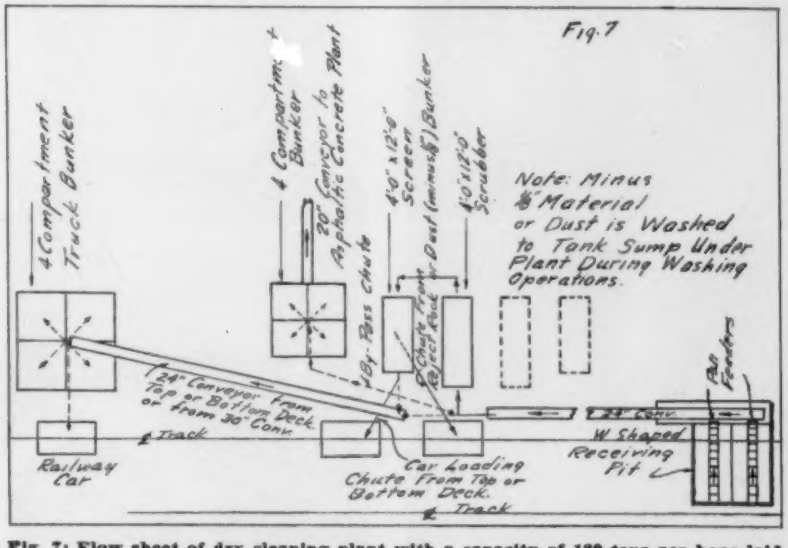


Fig. 7: Flow sheet of dry cleaning plant with a capacity of 180 tons per hour laid out to allow for an additional scrubber and screen

What Is In Prospect

OCCUPATIONAL DISEASE legislation and the legal problems growing out of employes' physical examinations, industrial codes closely akin to producers of siliceous sands in the process of becoming law, Federal legislation, the testing of foundry sands and policies of national defense were a few of the timely subjects discussed at the fifth annual convention of the National Industrial Sand Association.

At this convention, held at the Greenbrier, White Sulphur Springs, W. Va., June 13 to 14, important steps were taken in the event of a national emergency and in other matters where group action was considered necessary. In anticipation of a possible shortage of cars, it was voted that the Association of American Railroads be asked to advise and discuss with the Association the imminence of a car shortage in the future. As another step in keeping abreast with rapidly changing and unforeseen conditions, an emergency committee is to be appointed to be ready to act in the behalf of member companies.

At work and recreation at the convention. 1—C. Mathiesen, left, and J. A. Crew, discuss sand grading. 2—J. M. Strouss and John F. Putnam. 3—Harte Campbell, his dad, E. J. Campbell, and Russell Hay. 4—E. J. Campbell and A. Warsaw. 5—V. P. Ahearn and C. G. Runkle, visiting with Mrs. Hay. 6—E. O. Schneider. 7—J. M. Strouss, the new vice-president. 8—Mr. and Mrs. H. Thornton

RUSSELL G. HAY, president of the National Industrial Sand Association, formally opened the convention by mentioning how the Association in its brief period of existence had helped its members, mentioning briefly the fight that was put up against increases in freight rates, the active work of the research committee and the part being played by the Association in formulating the New York foundry code. This code, when finally enacted into law, will undoubtedly have far-reaching influence since codes enacted in New York State usually set precedents for other States.

New Officers

L. M. HANSEN, president, Industrial Silica Corp., Chicago, Ill., was elected president of the National Industrial Sand Association to succeed Mr. Hay. J. M. Strouss, Deckers Creek Sand Co., Morgantown, W. Va., was elected vice-president, and Ralph T. Stevens, Cape May, Sand Co., Cape May, N. J., was reëlected treasurer.

The board of directors includes E. J. Beyer, Rockwood, Mich.; Mark T. McKee, Detroit, Mich.; A. J. Miller, New York, N. Y.; W. J. Woods, Lewistown, Penn.; Hamilton Allport, Chicago, Ill., and C. M. Hardy, Evansville, Ind. P. S. McDougall, on leave of absence from his company, the Ottawa Silica Co., Ottawa, Ill., because of ill health, was elected as the first honorary member of the Association and of its board of directors.

Legislation and Defense

V. P. AHEARN, executive secretary, discussed and interpreted federal laws and legislation under consideration and spoke on the possible effect upon the industry of national policies growing out of the military defense program. His discussion of national defense was based on the prevailing points of view in Washington.

For Industrial Sand?

Possible car shortage, defense needs, legislation, foundry sand tests, and physical examinations of workers discussed by N. I. S. A.

It is his belief that the National Labor Relations Act will remain as is during the present session of Congress and that none of the amendments proposed to the Federal Wage and Hour Act are likely to be passed.

The Walter-Logan Bill is not likely to become law at this session of Congress, according to Mr. Ahearn. The new tax law, which would impose additional taxes of from one percent up to 19 percent upon corporate net incomes depending upon their amounts, a 10 percent super tax, excess profits taxes upon some commodities, which would lower the annual personal incomes upon which income taxes are assessed, were discussed by Mr. Ahearn.

Amendments to the Walsh-Healey Law are not likely to pass, in his opinion, but if they should would seriously affect the industrial sand industry since its provisions would embrace sub-contracts. In many cases member companies would be considered subcontractors.

Research Activities

STANTON WALKER, chairman of the committee on foundry sands, read a report on the committee's study of sieve analyses. His committee, which met earlier at the convention, had prepared an extensive report on sieve sizes for foundry sands which have been studied for the past two years. The purpose of the work was to review the results of comparative tests in order to arrive at a proper interpretation of the meaning of such tests, since the reliability of test methods is of outstanding importance to both the producer and user of sands. It was felt that adequate tolerances which would be consistent with practical production problems or consistent with the significance of the results to the suitability of the sand were often not provided for by purchasers.

The foundry sand committee study is based on how well one laboratory can duplicate the test results of another, which involves a determination of what variations may be expected from current testing procedure, reasons for such variations and their significance to the usability of a sand for a given purpose.

One series of tests was concerned with the reproducibility of sieve analyses of unbonded sands by different industry laboratories, using identical samples to determine what variations would result from different sets of sieves. Another series was designed to find how sieve analyses of unbonded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Some familiar scenes at White Sulphur Springs. 9—E. H. Daugherty, left, and E. M. Ayers, a convention veteran. 10—Hamilton Allport, a new director, and Geo. A. Thornton. 11—L. M. Hansen, J. M. Strouss, Tom Matthews, and Theodore Waters. 12—J. M. Strouss, Russell Hay, Mrs. Himmler of the Washington office. 13—A. Y. Gregory talking to Mrs. L. M. Hansen. 14—H. F. Spier. 15—A. J. Miller and John F Putnam. 16—J. A. Crew, at work in foundry sand meeting


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Left to right: Theodore C. Waters, Association Counsel; Dr. Raymond Hussey; and V. P. Ahearn, executive secretary, the three speakers at the convention

sands by different laboratories would check, using portions of a "masters" sample.

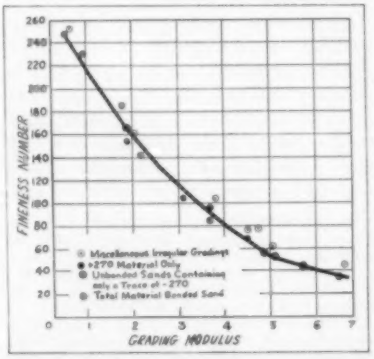
The first series showed good agreement of results for sands which were predominantly coarser than a No. 70 sieve. The percentages of range were high for those sieves retaining small fractions. It was also indicated that fractional results may be unduly affected by one sieve—if a laboratory is high for one fraction it often appears low in the succeeding fraction. Other information showed plainly the effect of under-sized or clogged sieves, which are conditions likely to arise in testing sands.

In the case of the "master" sample in the second series, differences were greater than for the identical sample, with ranges far too great to make feasible the application of arbitrary tolerances on a percentage basis.

Following discussion of Mr. Walker's paper, which was illustrated by graphs and charts showing the variations in test procedure, it was voted by the board of directors that the committee, after reviewing the study, offer it in the form of two or more papers for presentation at the next American Foundrymen's Association convention.

In concluding his paper, Mr. Walker suggested that consideration be given to expressing the gradation of foundry sand by a "grading modulus" to replace the generaly accepted fineness number which is much more difficult to compute. The "grading modulus" would be calculated tne same as it is done in computing the fineness modulus for concrete sand except that different sieves are used.

In the discussion of grading of foundry sands, emphasis was placed on the need for an understanding between users and particular producers selling the user, in determining tolerances. In other words, grain sizes and characteristics of sands in different localities are different and consideration must be taken of these differences rather than to attempt setting up single requirements to embrace all producers. The study is not being made to change or suggest changes in existing specifications but to determine the meaning of test results and to aid in interpreting them.



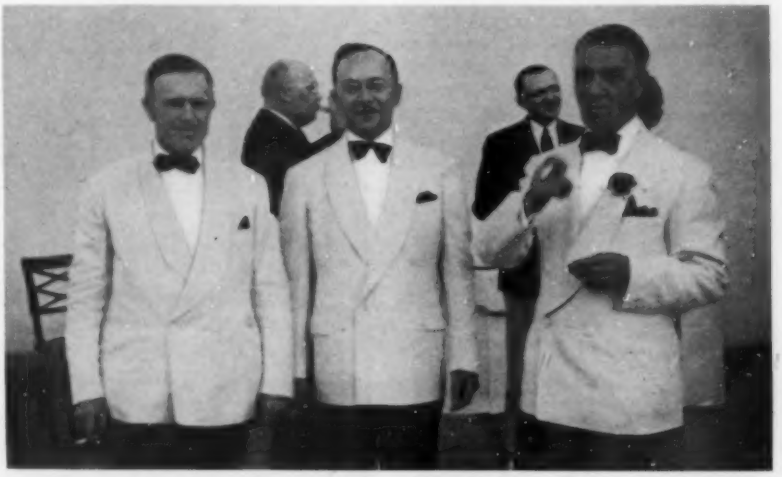
Relationship between fineness number and grading modulus of foundry sands

Since the last annual convention there have been important developments in the field of industrial health and an intensified interest in preemployment and periodic physical examinations for workers. Expert opinion on the medical side of the question and an insight into the legal problems growing out of physical examinations of employes were given by Dr. Raymond Hussey, Johns Hopkins University, Baltimore, Md., and Theodore C. Waters, Association Counsel, in two enlightening papers.

Dr. Hussey generally discussed the value of medical control in industry, but said that social incompetence must not be overlooked as a principal cause of rejections of workers along with physical disqualification. Tuberculosis, lead poisoning and silicosis were discussed in some detail. In silicosis, the air-borne particles of silica are the injurious agent, the presence of silica in the air not being in itself sufficient to result in silicosis, said Dr. Hussey. If the dust particles are greater than 10 microns in size, the presence of such dusts does not present a health hazard. Emphasis was placed on the importance of the smaller sizes that remain suspended in the air and the concentration of these particles per cubic foot of air.

Variations in the susceptibility of individuals to silicosis or racial differences in relation to susceptibility have not been determined, he said, but the occupational case history is of importance in each case. The disease is caused only by protracted inhalation, causing the formation of fibrous scar tissue in the lungs. Formation of this fibrous tissue does not necessarily constitute a disabling disease, nor is there any evidence that silicosis alone is disabling or a cause of death, said Dr. Hussey. It is the complications that are disabling, and tuberculosis, bronchitis and other pulmonary diseases may later cause death to occur.

(Continued on page 76)



Two former and the recently elected president of the National Industrial Sand Association. Left to right: Russell G. Hay, retiring president; A. Warsaw, his predecessor; and L. M. Hansen, the new president

By ELWOOD T. NETTLETON*

ARTICLE SIXTEEN

On sizing, testing and specifying aggregates offers some operating suggestions to crushed stone producers to insure acceptable products

Modern quarry shovel and loading operation

Ways to Avoid Rejections

WRITING as a salesman of crushed stone to the men in charge of quarry and crushing plant, I have some suggestions to make that I hope will be accepted as coming from one who has also had much experience in the production side of the industry.

It is a short sighted policy for quarry operators screening through a dry plant to try to save a little money by not thoroughly stripping. Starting in 1935 the company I was formerly connected with used considerably more care than heretofore, and still the total stripping costs per net ton of crushed stone sold amounted to approximately only one half of a cent per ton. It only takes a small percentage of loam or disintegrated rock to spoil a large amount of stone. Experience has shown that a truck load of 6 tons of dirty stone will spoil more than 60 tons of clean stone, if dumped into the same bin.

In the usual quarry operation the operating ledge ranges from say 50 to 150 ft. high, with the loam dirt and other material ranging from 6 in. to 3 or 4 ft. A fair average might be 2 ft. of loam on a 100-ft. ledge. Mechanical operations may strip most all of this material, leaving only a small part to be stripped by hand.

At the plants of the company I was connected with, until a few years ago, shovels on the quarry floor were either mounted directly on traction wheels or on railroad trucks. Loading was done at the quarry face and the stone transported by industrial railway to the primary crusher. One by one the methods and equipment have been revised, motor trucks being substituted for industrial railways transportation, and most of the shovels mounted on caterpillars.

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* General Superintendent, L. Suzio Construction Co., L. Suzio Trap Rock Co., The Suzio Trap Rock Co., and the York Hill Trap Rock Quarry Co., Meriden, Conn.

Example of a thorough job of stripping in a mid-west quarry

Another example of modern quarry operation

Besides direct savings in operating costs to the producer, a big improvement has been noticed in the cleanliness of the crushed stone product since this change in loading at the quarry face has been adopted. With this flexible equipment on the quarry floor, should the shovel in digging get into frozen, extra wet, or dirty stone, the equipment may be moved to another location where conditions are better. The shovels may be replaced at the former location when the material has dried out and the pressure of business is lessened. This will enable the shovel operator to use more care in loading, and allow the screens to operate more efficiently, by handling lighter loads.

Because of the economy in operation, as well as the improvement of quality, this motor truck method of transportation in the quarry is highly recommended to those operators of plants which screen dry.

Steadier Flow to Screens and Crushers

It is quite noticeable, in most quarries, that many of the crushers and screens are running idle too large a percentage of the time, and at other times they are overcrowded. This fact tends to produce jams or blocks in the crusher and over-crowding of the screens. This latter fact prevents a large percentage of the crushed product from reaching the proper openings and, consequently, causes considerable carry over, which in turn causes undersizing of the product. The installation of surge bins, chain feeders, and automatic belt conveyors might be desirable in some cases. Further time and load studies should be made.

Better Screening Capacity

Up to a few years ago crushers had comparatively small capacity and small reduction factors. The introduction of large shovels on the quarry floor brought about rail and truck transportation to the primary crusher. With increase of hourly tonnage to the crushing plant, producers installed large crushers. Too many producers, however, failed to increase their screening plants correspondingbeing satisfied if the stone went through without blocking. Consequently, while specifications were becoming more rigid, actual plant screening was becoming less effective.

It is quite evident that in many cases the screening efficiency can be improved, especially in the revolving screens, by changing the screen media and by the addition of baffle plates. Where it is possible, the substitution of vibrating screens for revolving screens would, no doubt, give still better results. In many cases the application or spreading of the load on the screen may be improved. In other cases the installation of double-deck screens, in place of single screens, will aid. By placing a screen of larger opening over the limiting screen, a large percentage of the unnecessary load is taken off the limiting screen, providing it a chance to work more efficiently. Woven-wire cloth is recommended for the large size openings.

(To be continued)

Quarrying without stripping

Predicting Separated Sand Sizes

(Continued from page 29)

rials into the overflow and to waste would decidedly improve it.

It was found very difficult to secure sieve analyses which would serve to make these plots. There are many such sieve analyses published, but the greater part of them are from the mining industry, and are made with feeds having a mixture of light and heavy minerals. What is probably the effect of such a mixture is shown in line No. 1, which cuts both the 28-35 and the 35-48 size groups at about 50 percent. The only way that this could come about would be the presence of heavy grains in the 35-48 size group. Possibly they were grains of black sand, which is not uncommonly found in river sands. If all the size groups had contained varying amounts of a heavy mineral it is plain that the samples could not be used for comparison.

Another difficulty was to find samples that would check. To illustrate, suppose it was stated that 48 percent of the feed went to the underflow and 52 percent went to the overflow, and that the sieve analyses showed that of a certain size group there was 8 percent in the underflow and 20 percent in the overflow. Then 48 percent of 8 percent plus 52 percent of 20 percent, which is 14.24 percent, should be the percentage of that size group in the feed. But the sieve analysis of the feed shows only 10 percent. One or two such differences in a series of sieve analyses might be "harmonized," if they were not too great, but where there are more than one or two the only thing to do is to look for another series.

It is useless to expect such samples to check unless they are taken concurrently and carefully cut down.

The samples used for these diagrams were furnished by the Link-Belt Co., and none of them required to be "harmonized" before they could be used.

(To be continued.)

Fluxes and Their Influence on Burning Clinker

Concluding article deals with the properties of plasticity and adsorption of different raw materials with relation to grinding characteristics

By STEVEN GOTTLIEB*

PLASTICITY can be defined as a group of properties, which are ascertained by well known physical and colloid-chemical principles.[11] Clay, which is to be made plastic by means of water, represents a system of capillaries which the liquid enters, in consequence of which swelling, adhesion and internal friction play a distinct part in the development of plasticity.[12] In considering adsorption phenomena, the type of adsorbing surface (shape of the particles) and the degree of comminution are of great importance.

Adsorption can vary between cases, where the external surface of particles or that of the pores and capillaries are concerned. This makes us realize that grinding to the same fineness (e.g. minus 200 mesh) does not always lead to the same plasticity when the raw mixes are composed of raw-constituents with different physical or colloid-chemical properties. Allophane clays,[13] consist of fine crystalline and gel particles, their degree of dispersion being higher than that of purely crystalline Kaolinits, feldspar-clays, etc.[14] On the contrary, it can be said that small differences in fineness in plant-grinding are insignificant for the behavior of the raw mix, provided the same types of raw constituents are used.[15] Extremely fine grinding, however, does not improve the plasticity of the raw mix. On the contrary, it can very often be found that an advantageous plasticity disappears when the material was ground too finely. (See also Graph 11.) Similar behavior was found by investigators in the case of Kaolin which was accounted for by the fact that the plate-shape of the particles so important to Kaolin-plasticity was destroyed by very fine grinding.[16]

CHEMISTS' CORNER

Problems and practices of the chemists in the industry are discussed on these pages. Contributions and comments are invited.

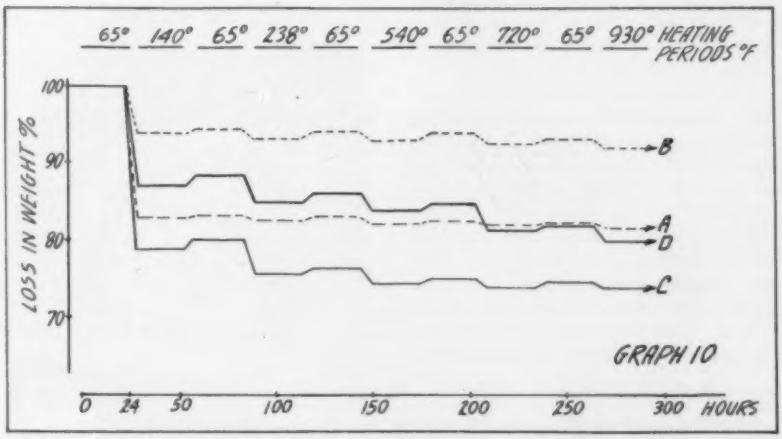
Plasticity of Raw Mix Affects Costs

At the dehydration of the clay-constituent heat absorption usually takes place at 900-950 deg. F., and heat evolution at 1700-1800 deg. F. The discharging of water as well as the changes in internal structure resulting therefrom[17] are of great importance for burning in various kiln systems.

Burning experiments in the laboratory furnace revealed differences in the behavior of raw mixes of the same chemical composition. In these tests, however, the plasticity of the various samples had not the same importance that they have in different kiln systems in service. Observations in different plants proved that raw mixes of the same chemical composition but of different physico-chemical state (usually incorrectly referred to as "plasticity") greatly affected manufacturing costs and cement quality. The raw-constituents which can be considered "easy to burn" exhibited a pronounced difference from other materials as to their plasticity.

Thus the necessity arose to perform in the laboratory a series of practical "plasticity" examinations which were adjusted to the particular circumstances in the plants: the ability to absorb water and discharge it at various temperatures, the strength of dried raw masses as well as their resistance to mechanical action (wear), and the practical fineness,—all of which were of special interest for each raw material.

Tests were conducted in the following way: Each constituent was dried and ground to 80% minus 170 mesh and prepared to equal "earth-moist" consistency with an adequate quantity of water in moulds, which were similar to those used for tensile strength briquettes. Then the samples were systematically exposed to gradual heating to different temperatures and the losses in weight determined. Each heating period lasted for 24 hr., then the samples were cooled off to 65 deg. F. and left at this temperature for 24 hr. Then the next heating stage started again. (Graph No. 10.) The results demonstrate that the water consumption required to obtain the same earth-moist consistency was the highest for the constitu-



Graph 10: Dehydration of various raw mix constituents at different temperatures

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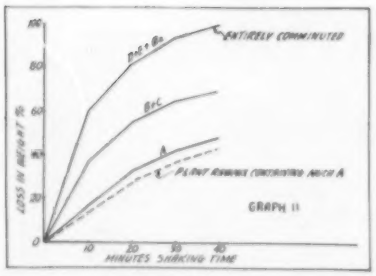

Graph 11: Resistance of different raw mixes against wear

ent (C) and the smallest for (B). The dehydration proceeded slower with (A) than with all other constituents. Grinding in the laboratory mill resulted for all samples in

98.8% minus 72 mesh, 82% minus 170 mesh, and
55.0% minus 50 micron (determined with an air-elutriator).

After heating was finished up to 930 deg. F., tensile strengths were tested. Results (in lb./sq. in.) were as follows:

A = 110.
B = 50.
C = was full of flaws, could not be tested.
D = 30.
E = 10.

The same strength figures were also reached by heating the samples to 930 deg. F. without any interruptions. The raw-constituent (A) which has shown itself the most favorable in shaft kilns furnished the highest strength, its water-requirement for wet process slurry also being highest (48%). Plant mill grinding which was somewhat coarser than laboratory-grinding proved that (A) produced still higher strength when moulded to briquettes and heated to 930 deg. F. Laboratory grinding produced 37% particles of "medium" size 50-88 micron, whereas plant-grinding had 50% of the same particle size-class. (Investigated with the pipette-apparatus of Andreasen.)

Wear Tests

A special practical method was adopted to examine the resistance against wear of heated balls formed from the different raw mixes. These were prepared with about 20% of water, then dried at 140 deg. F. for 24 hr. The wear test itself was carried out in a sieving machine. After being shaken for definite periods, the balls were rubbed off in different ways, varying with the physico-chemical state of the sample. By determining the losses in weights after definite periods of shaking, curves are obtained which are typical of their resistance to mechanical friction. Repeated experiments (controls) showed very slight differences in the values obtained. (Graph 11.)

The wear tests, too, confirmed the results established by the heating experiments. Here again it was not the highest degree of fineness at which the greatest resistance was displayed. With somewhat coarser distribution of particles, in which the "medium size" 50 to 88 microns seems to be a matter of some importance, the lowest wear figures were obtained.

When raw materials of different hardness or brittleness are ground, certain constituents (SiO_2, $CaCO_3$) may remain in a somewhat coarse form. For example, when grinding a mix of soft chalk and hard flint for the purpose of obtaining a favorable Silica modulus, an accumulation of SiO_2 in the residue of 170 mesh will be found. On grinding a particularly hard limestone with soft clay, $CaCO_3$ may accumulate in the same way. This peculiarity is usually observed when compound mills are in operation and can partly be counteracted by grinding in closed circuit.

In order to determine the influence of such heterogenity on burning, the same raw constituents, chalk and flint, to which clay and some ash were added to reach a normal chemical composition with a lime-saturation-value of 94, were ground in the laboratory mill, first together (raw mix No. 1), then separately (raw mix No. 2) to 80% minus on 170 mesh. (Table No. 12.) In this way a different particle distribution was effected with the same chemical composition, as the harder constituent flint, turned out coarser after the common grinding of the charge; i.e., the residue on 170 mesh accumulated some SiO_2. When the raw mix was prepared *after* each constituent was ground separately, this accumulation could almost be eliminated.

Tests in the laboratory-furnace proved that the burning-temperature of 2370 deg. F. which lasted only 5 minutes was sufficient to produce clinkers of equal quality from both raw mixes. Thus, SiO_2 particles greater than 88 micron could be brought into reaction without difficulty. That this not only comprised "a reaction of all SiO_2" but also the formation of the desired clinker constituents, was also proved by the quality of the burnt clinkers ground in the laboratory mill to the same degrees of fineness. Silica particles up to 200 microns dia. reacted almost completely at $2500/_{5'}$—up to 500 micron at $2560/_{20'}$. With the latter burnings, however, free lime did not entirely disappear, more $2CaO.SiO_2$ was formed and the clinkers dusted down (i.e. crumbled) by storing. When still larger SiO_2-grains (up to 800 micron) were in the mix, after burning white dots remained in the clinker, from which dusting started. Such large flint lumps could only be brought into reaction by changing the chemical composition (reducing the lime saturation value from 94 to 87).

(Continued on page 45)

TABLE 12: INFLUENCE OF GRAIN DISTRIBUTION IN RAW MIX ON BURNING IN THE LABORATORY FURNACE

The raw mix was composed of the raw constituents = C + D + E + Ash

Sample (1) (all constituents were mixed and ground in the laboratory mill)
Sample (2) (each constituent was ground separately and then mixed)

Fineness of the raw mixes:

	minus 72 mesh %	minus 170 mesh %	Residue on Sieve 170 mesh	
			$CaCO_3$ content %	SiO_2 content %
1	96	84.5	78.25	13.5
2	94.8	86	67.75	26.4

Fineness of Clinkers burned at 2370/5 and ground in the laboratory mill:

	minus 170 mesh	minus 200 mesh	weight per litre
1	93.5	81.5	1055 gr.
2	93.3	82	1060 gr.

Properties of Cements

	Setting time			Soundness	Bending strength plast. consistency 11% water			Crushing strength earth moist consistency 8% water		
	water	Init	Final	le Chatelier	7 days	28 d. water	28 d. comb.	7 days	28 d. water	28 d. comb.
1	26.5	155'	225'	2 mm	540	632	725	4880	7790	8300
2	26.5	155'	245'	1 mm	544	628	740	4925	8210	8415

What Should It Cost To Make Lime?

By VICTOR J. AZBE*

IT IS STRANGE how very different lime plants can be; how different conditions under which they operate, and how varied the final results. Some are producing lime at half the cost of others, some have regularly a 40 percent and even more profit on sales and others, year after year, are in the red. Why should there be such a great range, and what is the basic reason?

These questions are all important to the lime man of today, and if he does not answer them reasonably well, he possibly will not be a lime man tomorrow.

In some plants, compared to others, stone costs twice as much, or fuel consumption may be twice as great, or labor twice as high, or production may be so low that overhead is far too high.

Mechanize Quarry

Conditions in different plants are entirely too diverse to be covered completely by any single paper, but we can lay down guidance lines that will need to be varied according to the conditions, and this will not be done from any theory. Each has its basis in some specific plant. If we say for example, that lime can be made loaded in cars for $2.50, then there is a plant somewhere that has elements of this possibility. Not every plant can do it, but certainly the manager should know precisely why he is not doing it. If he knows that, then almost certainly his lime will soon cost less, although it may never reach the ideal of $2.50.

Stone, of course, must be cheap, but very cheap stone can only be obtained from mechanized quarries. However, mechanized quarries produce lots of spalls and if there is not a market for spalls, it either means big waste or rotary kilns. However, there is a way around that now and something that we are only just beginning to realize.

Above: Truck dumping over grizzly. Below: Jaw crusher for crushed stone. Larger sizes by-pass to kiln cars

Stone from 2 to 5 in. are not spalls and can be readily burned in vertical kilns. If the crusher is followed by a double screen separating the stone in sizes of 5- to 10-in., 2- to 5-in., and 2-in. down, the first two can be burned in separate vertical kilns and the last, representing about 23 percent, can be wasted, if there is no market. There is not so much more of this minus 2-in. over even hand breaking quarries' waste, that the difference could not be sacrificed for cheap overall cost of stone.

A couple of years back, the quarry of Plant "A" was mechanized with a jaw crusher, a shovel and some trucks. Some views are shown herewith.

Shovel loading stone into truck

On the whole, there are two main faults to this crude installation, both very serious; one tends to raise the cost of stone, the other tends to lower capacity of the kilns. It will be noted that there is single, stationary bar screen which does not make a good screen at its best. From this, the larger sizes of stone go to the vertical kilns, the small either go to the spall pile, or secondary crusher, for crushed rock and pulverized rock sales.

With the single screening and this kind of screening, there is too much good kiln rock in the spalls and too many spalls in the kiln rock. There is too great a waste of kiln rock, and the kilns suffer from too great a range of stone sizes.

Rock cost per ton of stone utilized was 39.5 percent, counting labor of drilling, loading, trucking, crushing, screening, disposing of waste, charging of kilns, power and powder. Only the equipment overhead, repairs and depletion are not included. The labor rate is 40c per hr.

The cost considering that the operation is definitely small scale is not bad. But it could be much better, as in getting stone from the screen to the kilns, five men are involved and that is a big proportion of the total. To say that this in the ideal is four too many would sound ridiculous, if we had not a definite example in Plant "B," the 125-ton lime plant

*From a paper presented before the National Lime Association convention in Chicago, May 21-23.

Close-up of bar grizzly screen. Oversize drops in one car, throughs in another

LIME FORUM

Mr. Azbe is a contributing and consulting editor of ROCK PRODUCTS. He will be glad to receive inquiries from his readers, and will answer these direct or through the columns of this Forum.

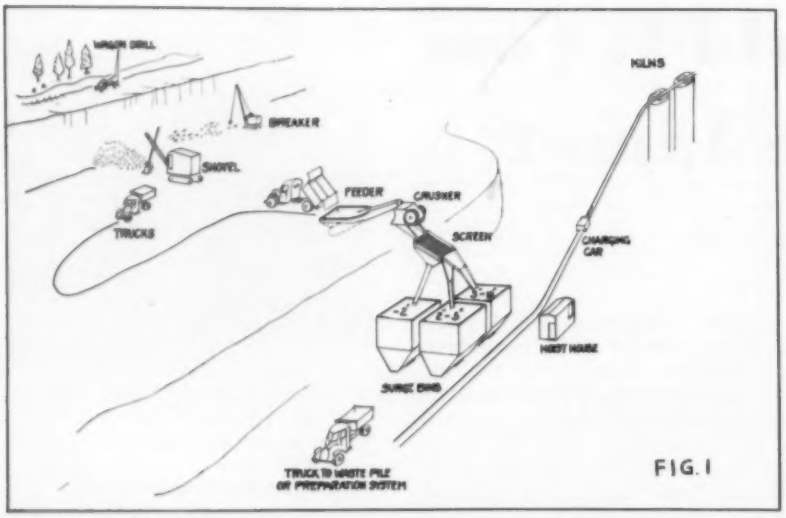

Fig. 1: A simple idealized quarry serving a lime plant has surge bins to prevent delays

where one man in eight hours charges the kilns for the full 24-hr. period. This plant "B," which will serve as an example, is fully mechanized, not only as to quarry, but also in several other respects. It is mechanized but not extravagantly so and therefore overhead does not eat up the savings otherwise attained, which at times happens when plants are modernized.

Into this picture, we may bring still another example, plant "C," the management of which had a very difficult time for several years. The following tabulation gives comparative quarry labor costs of the mechanized plant "B," and the non-mechanized plant "C," and the contrast is startling.

Plant "B" produced over six times more stone per man than plant "C". It is this, in part, combined with still other similar reasons prevailing in other departments, that Plant "C" was sold.

For the production of the 2900 tons of lime, Plant "B" required 2100 "Kiln Plant" hours. To this, of course, there are to be added, "Hydrator," "General," and "Crusher" hours. The "General" and the "Crusher" hours are high on account of the large stone shipments, and it is difficult to reduce them equitably to lime produced. However, this comparison gives us a great deal of information and reveals that when there are no undue complications, such as excessive stripping, undue amount of sorting, and the extraneous labor, separate from the quarry but connected with large stone shipments; that we can accept as a standard of good performance, two hours of labor per ton of lime for the plant as a whole.

This would include all operations from quarry stripping to and including the hydrator and loading, and that means 30 men for a 125-ton plant.

We know of no one that is doing it exactly, except that the above plant "B" is, if the quarry, crusher and general hours were properly charged off for crushed stone shipments. Ordinarily, overall plant labor is from four to as high as six hours per ton of lime.

A simple calculation reveals that the saving of just one hour of 40c labor per ton of lime nets in a 125 ton lime plant, fifty dollars a day, which would pay interest, depreciation, insurance and taxes on around $100,000.00 of investment. It therefore appears that modernization of obsolete plants could be well justified to give them a new lease on life.

Fig. 1 shows a simple idealized quarry. A wagon drill, stone breaker, shovel, two or three trucks, crusher and simple screening plant make up the equipment. If "B" can quarry 20,000 tons of stone a month with 12 men, then we, for a plant of 125 to 150 tons of lime with only 6,000 to 7,000 tons of stone, should do it with five to at the most seven men. That includes everything except extensive stripping; it includes charging of kilns, for which only one man is needed. He draws the stone from the surge bins into the 6 or 8-ton kiln-charging car and also operates the hoist. He does it all. There is no man on the kiln top, and the kiln and car doors open automatically when the stone car is in position.

The bins are not intended to be storage bins but just merely surge bins and are shown too large. Their intended use is merely to permit crusher to operate when the charging car is away, and also to get stone when there is an interruption in the quarry. Large bins break up too much stone which segregates and kilns then do not get truly sized stone. Large bins become an advantage only when they are large enough to hold sufficient stone to keep the kilns in rock over Sunday.

For a limited lime plant capacity, equipment need not be too costly; a 20-in. crusher, two large and one small truck, a ¾-cu. yd. shovel and still all of the stone could be handled in six hours which would permit Sunday morning or afternoon operation and allow kilns to operate continuously, greatly increasing over all capacity of the plant.

Fig. 2 is a direct continuation of Fig. 1, and shows a producer gas fired lime kiln plant. The kilns have a submerged gas off-take with storage zone above; they are of balanced draft type having both induced as well as forced draft. Kiln waste gases are used in the gas producer as a substitute for steam and also for tempering of heat in the kilns when that is desired. From such kilns, a ratio of between 5½ or 6 to one may be expected with coal having a heat value of about 13,500 B.t.u. Fuel cost would be in the neighborhood of 75c per ton.

Kilns are of 50 to 70-ton capacity. A modern kiln for 50 tons of lime is so small that it hardly pays to build

MONTHLY QUARRY LABOR OF TWO CONTRASTING PLANTS

Plant	"B"		"C"	
Lime Produced	2900		3052	
Stone Shipped	14400		None	
	No.	Hours	No.	Hours
Foreman	1	200	1	200
Shovel Man	1	234	Breakers & Loaders	24	3448
Drillers	2	600	Drillers	7	1090
Swampers	2	632	Powdermen	2	311
Truckers	4	1020	Motormen	4	621
Miscellaneous	2	424	Track Labor	4	661
			General Labor	1	180
	12	3110		43	6511
Tons Stone Per Quarry Hr.	6.3			.92	

smaller, although they can be readily operated at lower capacity if that is found desirable.

A three-kiln plant balances out nicely, and when one is being repaired the other two can be forced to the limit. At peaks, 150 to 180 tons of lime could be obtained with no more labor than when a lesser amount is produced.

As stated before, the kilns are charged by the man at the surge bins. Each kiln has a stone storage space sufficient to last through the night and while stone is charged only in the daytime, the kiln proper gets it every draw.

The regular kiln plant force consists of three men on each shift with one spare during the day shifts. Each of these has a specific duty but helps out at any one point. There is a working foreman who trims the kilns and therefore is always familiar with their condition. There is the fireman who takes care of the gas producer, watches the instruments and helps the foreman trim the kiln; the third man is the lime man who draws and sorts the lime. If necessary in the sorting, he is helped by the foreman.

Kilns are drawn equal time periods apart. The draw car holds in its divided sections, one draw of lime. It does not take even five minutes to draw, then the lime is dumped into the pit and sorted while it passes on the conveyor to the screen and car loader.

All of the lime is disposed as soon as drawn; that is, the lump lime is loaded into cars, the 2-in. passing to the raw lime bin ahead of which is another screen which separates the pebble that may be shipped separately and the hydrator fines. The three men at night do all of this except, of course, for hydration which is entirely a day operation.

This may appear visionary but there is a plant where this exact operating procedure is followed and apparently to the full satisfaction of everybody, including the labor force. It is true that in that case fuel is natural gas, but modern producers, after one knows them, do not require much extra labor at least not so much extra that the three men could not take care of it. The ash and coal is, of course, handled by the extra man in the daytime.

Summing up, we accounted for seven men in the quarry, ten men in the kiln plant, four men in the hydrating plant, 21 in all. In the shop, probably three men will be needed, then the combined storekeeper, bookkeeper and clerk and in addition five men for here and there for odd jobs or help outs, all of them on in daytime with only one, a watchman, at night.

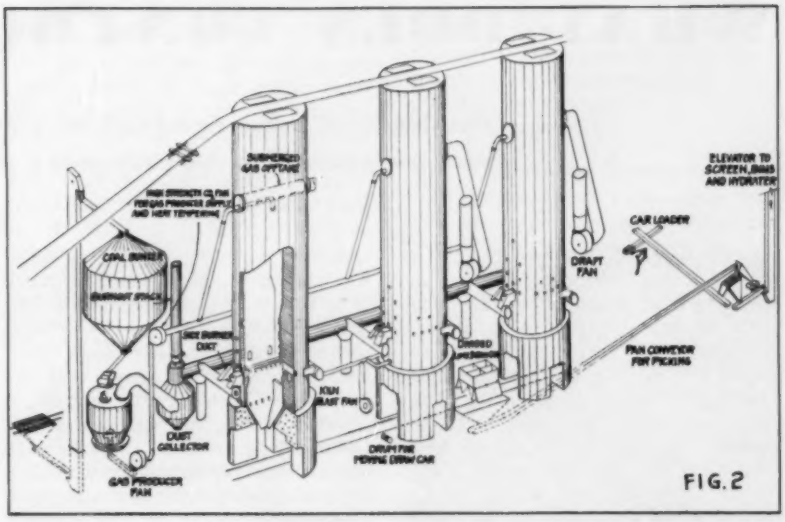

Fig. 2: Recently patented producer-gas fired lime kiln plant has a submerged gas off-take with storage zone above

This accounts for the 30 regular 8 hr. shifts; there are others but they are substitutes under the 40 hr. law. By contrast, we know of similar capacity plants that employ 100 men.

At this point, we will stop being precise with figures. If we continued to be they would not mean anything because so much depends on conditions. But as a whole we can say that, eliminating hydrator cost and labor, as the hydrator should stand on its own feet anyway, then what we have will give us $2.50 quick lime in cars—not lime sold, but just manufactured and in cars, including investment charges. It is an ideal, which few producers will ever be able to approach, but all can use as something at which to shoot.

(To be continued)

Chemists' Corner

(Continued from page 42)

The possibility of sintering coarser raw constituents is strongly influenced by their physico-chemical state. This was clearly observed on burning in the shaft kiln battery. With a higher percentage of raw material (A) in the raw mix, faultless clinker could be obtained, in spite of coarser raw material grinding, kiln capacity remaining almost unchanged. Somewhat higher silica modulus and lime saturation value could also be tolerated without difficulty. With the raw constituents (D), (E) and (C) burning reacted on coarser grinding much more sensitively. With higher silica modulus, burning was rendered very difficult and with higher lime saturation value, soundness also became deficient. However, with flux-admixture of Fe_2O_3 by which silica modulus and lime saturation value both were lowered, burning became quite faultless.

The coarser grains in the raw material mixture, though slackening the rate of reaction at heating, do not always prove to be a disadvantage when kiln systems are used where the raw mix is fed in the form of briquettes. Apart from the fact that certain particle-distributions favor plasticity, coarser grains in the calcining zone seem to facilitate the passage of combustion-air through the briquettes, thereby securing more uniform sintering. Experience has shown that in shaft kilns with somewhat coarser anthracite or coke-dust, better results were obtained than by adding finely ground coal. It is also remarkable that admixing moderately granulated clinker-dust to the raw mix can greatly promote burning in automatic shaft kilns. In the case of certain raw materials it has become possible to increase greatly the kiln capacity and to improve fuel-economy with unaltered cement quality by circulating 5 to 10% clinker-dust with the raw mix.

The author is indebted to Mr. E. W. Ruhnow for his assistance.

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WHAT DOES CONTROL PRICES?

Presidents of some representative rock products companies discuss economics of business

We sent advance proofs of the editorial, "Why Not Discuss an Economics of Business" in the June issue of Rock Products to a few presidents of representative companies. We were looking for reactions and constructive ideas along the lines suggested. We were complimented that men of the calibre who responded did read and make comments. Only one was willing to be quoted so we will make all the comments anonymous.

Those who read the editorial in question we hope did not consider that we put it forward as orthodox economics, or the last word that might be said on the subject. We made this clear in the letter we sent with copies of the editorial to our correspondents, in which we said:

"Maybe I am wrong, but it has seemed to me that the Science of Economics, so-called, as developed by New Deal doctors of philosophy, never has got very close to the economics of business. The answer would seem to be that business men should write their own theories and doctrines of economics.

"With that end in view I have long been agitating *free* and *open* discussion by business men of pricing policy, or better pricing philosophy. That's rather an indefinite term, so in the editorial for our June issue I am developing that thought with a tangible suggestion.

"Producers always seemed stymied when on the subject of relating price to unit costs because volume is so important a factor in unit cost. If we could find a way to equalize unit costs regardless of volume it seems to me a big stumbling block would be overcome."

Prices Have Little Relation To Costs

Of course it is notorious, as one of our correspondents points out, that prices are now made with little direct reference to costs. He says: "You apparently start out on the premise that prices are made largely, or at least partly, on the basis of cost and that if costs can be equalized it will, therefore, tend to stabilize prices. My belief is that in most cases, at least in the field with which I am familiar (cement), prices bear no relation whatever to cost except on an average and over a long period of years. It is true that a concern which sells below its true cost including reasonable capital charges, must eventually go out of business, thus relieving the pressure and tending to advance prices, but this process requires a long period of years to work out and over any shorter period prices are made almost entirely on the basis of competition."

Our answer is that we were suggesting a possible way to return to a sound basis of making prices based on costs, or on a system of cost-keeping; to get away from the belief of one producer that he has made a profit because one season's volume was so large his costs were extremely low, when in fact in order to get his large volume he has so reduced the current price that in the following season, with a low volume, he will lose money along with his competitors.

The same commentator continues: "I also take exception to your comments in regard to depreciation. I do not know of any industrial enterprise outside of some mining companies that operates on a liquidating basis. In the cement industry, depreciation is not usually looked upon as a fund set up for the purpose of eventually returning to the investors their capital. On the other hand, assuming that the raw materials have a more or less indefinite life, we figure depreciation as the amount of money which it is necessary on the average to spend on the plant to keep it in an up-to-date competitive operating condition. Obviously if depreciation reserves are spent in plant improvements they cannot be set up in liquid form to be returned to the security holders."

Again in our too brief statement we did not make our point clear. It was not proposed that the company should liquidate the shares of stockholders, but should provide real assets to assure the actual book value of the shares at any time. If the depreciation, depletion and obsolescence reserve is spent for constant renewal of plant and equipment the actual value of the investment will not diminish, the real assets are there in a constantly uptodate plant, ordinarily, probably, the best of all uses of a going company's surplus.

The following from the chief executive of a sand and gravel company is interesting:

Idle Plant Expense

"Of course, we cannot tell what we may next expect from a Government which attacks a business now for doing what it was almost compelled to do under N.R.A., but that doesn't help us much now, and what business needs to do is to help itself to every extent that it can within the law. First of all, we must know what the law is, and that is sometimes hard. But I suggest that you read a copy of Section 2 of *The United States Law Week*, April 30, 1940, Vol. 8, No. 18. This publication recites some interesting things on page 722 having to do with trade associations and anti-trust laws, and a consent decree in connection with the Department of Justice's recent activities. The point about it is that in that decree certain practices were expressly permitted. I will not try to enumerate them, but that may be somewhat of a start as to what may be done under the law.

"I do not know whether it can be done under the law or not, but it seems to me that it would be helpful if producers could discuss the matter of costs, probably under more or less expert direction of someone who knows the general theory of cost keeping. Such a man might suggest the keeping of an account known as 'Idle Plant Expense,' that is to say, if a company is working under a fixed depreciation basis and has a piece of idle equipment on which other expenses are accruing, such as taxes and maintenance, they can segregate that in their costs and apply to their actual cost only that part of their equipment which is engaged in their business. Eventually, of course, that idle plant expense has to be swallowed by the business, but it can be kept apart from company costs on which current prices are set. If this idle plant expense tends to mount and continue year after year, the company can well give consideration to disposing of surplus assets or tearing them down and writing them off. Another thought in connection

with your suggested depreciation per ton or per unit is the establishment of a minimum depreciation on a given piece of equipment, whether it works or not, or this given depreciation is taken each month whether the plant works or not. This is set at lower than normal and, if production passes a certain point, an additional accelerated sum is taken per ton after that point is passed.

Too Much Depreciation; Not Enough Obsolescence

"In general, you may agree with the thought that probably sand and gravel producers take too much depreciation and not enough account of obsolescence. Of course, there are exceptions both ways.

"Feeling that perhaps the second paragraph above this one is not clear, I will illustrate. Suppose a company has a plant which cost $100,000 and the company thinks that proper depreciation should be 10 percent per annum. We will say that, if the plant is worked to capacity, it will produce 100,000 tons a year, but the market requires only 50,000 tons a year. Using the first suggestion, this company would put half of its depreciation and a reasonable sum for taxes and maintenance into 'Idle Plant Expense.' This, subtracted from actual total expense of the plant, will leave a sum which can be used for current pricing based on costs. As noted above, this can continue to grow for a time probably without harm to a well-established company and may, in a good year or two, be absorbed again in costs. Of course, if a company cannot continue at 50 percent of capacity and absorb all its costs over a period of years in its selling price, it will go broke, or will have, before that point is reached, disposed of part of its plant. The second illustration would be on the same plant; instead of taking $10,000 depreciation a year, or 10 percent of $100,000, the company would set up a depreciation of $5,000 whether the plant works or not. At some point of production, perhaps 40,000 tons, additional depreciation will be taken up, perhaps at the rate of 15 cents or 18 cents a ton instead of the normal 10 cents a ton if the plant is working to capacity. Then, if the plant gets to capacity in any given year, the total depreciation would reach $14,000 to $16,000.

"Of course, the plant in question is a hypothetical one, but nonetheless, we have made limited use of both of these processes and, I think, will use them more. I think that depreciation based on production is, in principle, approved by the Bureau of Internal Revenue.

Selling Above Cost Is in Public Interest

"I believe you are ahold of a live subject, which is the question, how shall a company or a group of companies operate in the aggregate business with a reasonable expectation that they may sell their products above cost. That is a reasonable hope of any business. It is in the public interest because, unless a company sells above cost, the quality of its products inevitably suffers. I can not believe that there is any law which prevents a group of men from discussing freely and openly the matter of costs just so that there is no concerted effort made to fix or maintain prices."

The consent decree case referred to by our correspondent is that of the U. S. District Court for the Southern District of New York involving the National Container Association.

The point he raises about the Bureau of Internal Revenue of the Treasury Department allowing some elasticity in depreciation-obsolescence charge-offs is brought out by several other commentators. For example one lime manufacturer arranged with the Treasury Department to write off an abandoned plant in four years instead of in one year, or instead of as a long term write off along with depreciation and depletion of the other plants. A sand and gravel company president has been allowed by the Treasury Department to estimate expected tonnage over a period of years and to write off depletion, depreciation and obsolescence on a *straight per ton basis* of actual production based on the long term estimate. This is a simpler way of arriving at the same end suggested in the May issue editorial, since a charge off of say 15c per ton would be a higher *percentage* of cost in high volume (low cost) years than in low volume (high cost) years.

The president of a large cement company puts his finger on the weakness of our editorial when he says: "It seems to me the difficulty is not in lack of opportunity or right to discuss freely and openly the economic problems of one's own business. The opportunity exists in the columns of such publications as yours and of the press generally. The right to engage in such discussion is, so far as I know, not prohibited by the anti-trust laws. The real difficulty is the complexity of the problems themselves. It is hard to find their solutions and, even if found, to describe them in such a way that they may be understood and applied. This is illustrated by your editorial."

We accept the indictment. Our treatment, as we see it now, was too brief to be clear. However, our correspondent differs quite radically with our suggestion, which he at least did understand. He says:

Values Not Stationary

"I do not see how values can ever be made stationary or permanent. What one puts into a concern may never be realized. On the other hand, it may be considerably augmented by certain factors. Business conditions, competition, politics, war, and many other causes may enter to change the value of one's investment. Market conditions also change the value. The attitude of buyers who, by unwillingness at one time and by strong desire at another to purchase goods, may cause movement of prices up or down, thus affecting profits and value of the security.

"The method of charging depreciation to equalize costs based on production is, according to orthodox economics, unsound. Depreciation continues on capacity which is idle, and certainly obsolescence does, and the item called depreciation usually covers obsolescence as well as depreciation. This being so, to vary it according to volume can hardly be considered sound business, particularly when in years of low production and sub-standard depreciation one faces complete doubt and uncertainty as to the future, with no assurance that one will be able to make in those future years plus-standard and plus-normal depreciation and obsolescence charges to compensate for the sub-standard charges of the previous years. Frankly, I do not see how true values can be changed by bookkeeping. Elastic bookkeeping will not insure return of original investment."

No, it won't insure return of one's investment, but the "elastic bookkeeping" might insure against establishment of prices below all costs or prospective costs, and thus insure a greater degree of security for the hapless stockholder. Also, we don't overlook the fact that many stockholders buy and sell stocks because of the gambling responsibilities.

Editor's Conclusions

So much for comments received to date. We welcome others. To some extent, at least, our purpose has been accomplished. We have shown that a variety of ideas on price philosophy are current. We have shown that such discussions can be very interesting and instructive, whether, when carried on by a group of producers they are unlawful or not.

(To be continued)

Hints and Helps

★ FOR SUPERINTENDENTS ★

High Pressure Jets to Wash Sand and Gravel

MONROE SAND AND GRAVEL CO., Monroe, La., has made extensive use of hydraulic jets to wash sand and gravel thoroughly. After the sand has been removed over a gravity screen, the gravel goes to an inclined washing table. In the floor of this table are two 3 ft. sections of tanks, the open tops of which are flush with the table, the rest of the tank with the closed end extending through at right angles to the washing table. Gravel is chuted to the table and enters the tanks where the material is subject to a jet of water at 60 p.s.i.

The washed gravel then flows to the bottom of the washing table where it strikes a baffle plate which deflects the material to another gravity screen that removes pea gravel sizes. The oversize is then chuted to a screen for final sizing.

Sand which was removed by the first gravity screen is chuted to a 6-in. cast iron pipe extending out to a sand settling tank made from a section of a boiler. The sand is driven to the sand settling tank by means of a 1½-in. water jet at 60 p.s.i. A 10-in. cast iron pipe carries the overflow to a flume which wastes into the lake.

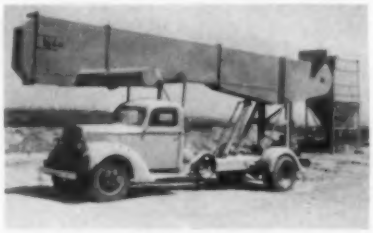
In the illustration is shown the sand settling tank. It rests on sections of steel rails, extending horizontally to the plant structure, and in turn is supported by a welded steel column on a concrete foundation. Above the settling tank may be seen the rods and levers which operate six gates in the bottom of the tank. About a cubic yard a minute is handled by the tank.

Sand released by the levers flows into a two-way chute and drops onto a hinged deflecting chute which permits loading into cars on either track.

John A. Buechler, superintendent of the plant, designed and built the two washing units.

Elevator for Special Cements

KERN ROCK CO., LTD., Bakersfield, Calif., Dan C. Gill, president, has designed the bulk cement elevator illustrated herewith for handling cement to bins for batching in oil well construction. The elevator is manufactured by the Los Angeles division of Stephens-Adamson Co.



Bulk cement elevator mounted on truck handles cement to bins for batching in oil well construction

Helpful Hints On Care of Hose

INDUSTRIAL PLANTS, as well as municipal fire departments, must give their fire hose expert, systematic care in order to get the most out of their purchases. Hewitt Rubber Corp., has outlined a list of suggestions for the handling and maintenance of hose which should be of value to users in the rock products industries.

1. When new hose is received do not allow it to remain packed in cases until it may be required. Remove the cases and loosen the coils.

2. Do not allow hose to remain in trucks or on reels, if wet or muddy. Remove all mud by washing or brushing with a coarse broom and expose to air, in towers or on racks, preferably at full length, to dry.

Hose that is antiseptically treated will not mildew or rot if given ordinary care, but continual dampness is injurious to cotton fabric. Mud often contains metallic or other substances that are chemically injurious to hose if permitted to remain on it.

3. Do not permit hose to remain on apparatus for any great length of time when not used. It should be removed, hung up in towers or on racks, and replaced with a fresh supply. Avoid short bends in hose that is stored away. When necessary to store hose in folds, the folds should be changed occasionally to overcome permanent set in the rubber lining.

4. Unless hose is likely to encounter a freezing temperature it is not necessary to drain the water out perfectly, as the rubber lining isn't injured by dampness within. On the contrary, hose is benefited by remaining in a moist condition. All rubber lined hose should have water passed through it at frequent intervals to moisten the rubber.

5. Hose when frozen is liable to crack, if bent while in that condition. Extreme cold causes deterioration of rubber, but not sufficient to prevent storage of hose in cold hose houses, if thoroughly drained and dried.

6. Avoid exposure of hose to very hot, dry air. It should not be stored where exposed to the sun's rays. When hose must be kept in hot, dry places, it is best to pass water through it monthly.

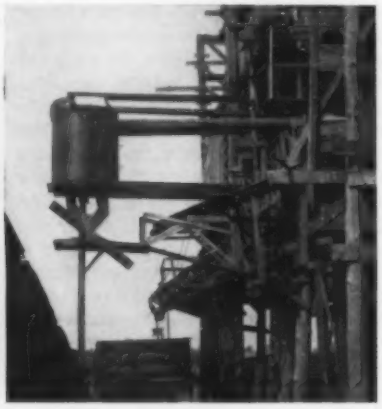
7. When fire hose is being used, see that section nearest engine or hydrant is not being chafed at point of contact with the ground by vibration.

8. Acids and other chemicals, oils, iron rust, etc., fumes arising from some processes are injurious to hose and contact with them is to be avoided.

9. When discharging or recharging chemical engines or extinguishers, see that solutions used do not come in contact with the hose.

10. Be careful that the gasoline

Left: Sand settling tank on steel T-rails projecting horizontally from plant is supported on welded steel column placed between tracks for convenience in loading sand. Right: Close-up showing feed and overflow pipes with pivoted chute below



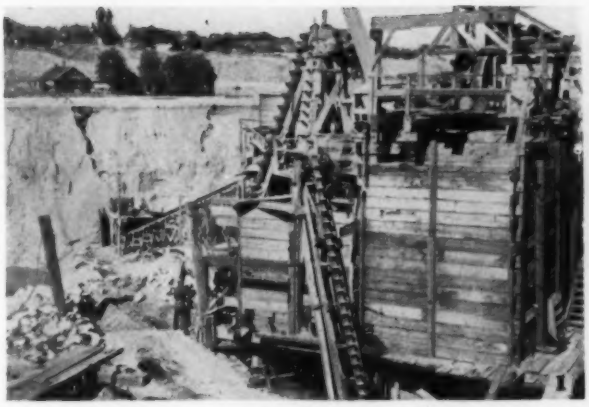


Fig. 1: Plant of J. Frese Sand and Gravel Co. Face being worked and hoist structure is at left

Fig. 2: Scraper bucket brings down cross section of material from bank to hoist structure

tank in your motor car is perfectly tight against drip and vapor. A small moisture deposition of gasoline leakage acid separates the rubber from the fabric of fire hose and produces subsequent failure when placed in service.

11. Before returning hose to apparatus or reel, see that the sections (or line of hose) are not twisted. Each section should be laid out straight and perfectly flat on the floor or ground and carefully examined. If not twisted the sections or line of hose will collapse naturally in a flattened condition—if twisted, the irregularities in the form of "lumpiness" will be observed or quickly detected when folding the hose on the apparatus or when applying it to the reel.

Recover Sand from Settling Box Overflow

J. Frese Sand & Gravel Co., Spokane, Wash., added a new hoist, scraper bucket, scalping screen, jaw crusher and conveyor from pit to plant. The original plant is conventional except that the sand recovery system is a little unusual. It involves the same idea as that described in the "Hints and Helps" columns of the November 1938 issue, Rock Products, as used at the Hiwassee Dam aggregates plant.

The sand left from the gravel screening and washing operation is deposited in a sand-settling box, from which it is recovered and dewatered by perforated buckets on a chain elevator. The overflow of the sand settling box, instead of being all wasted as is usual, is recirculated back to the settling box to build up the percentage of fines in the sand recovered by the bucket elevator. A sand pump manufactured by the Coeur d'Alene Hardware and Foundry Co. is used to recirculate this material.

The pit has a high face, as the views show. It has been excavated with an Osgood electric revolving shovel of 1 cu. yd. capacity. Motor trucks then carried the excavated material to a hopper at the plant, where a bar grizzley rejected all oversize material.

Obviously in working a high face of this character in a limited area, where the material varies considerably at different places (this is an alluvial deposit), it is desirable to feed the plant with a cross-section of the material from the bank. To accomplish this, a Sauerman 1-cu. yd. scraper bucket, pulled by a hoist mounted on a structure in the pit, was installed.

The scraper bucket installation is unusual in that no head blocks are used. While this is not considered good practice in general, in this instance the bucket is really trenching down a high bank, and the cable winds on the drum without the help of head blocks. The hoist is pivoted so it can make radial cuts.

A Symons horizontal vibrating screen, 36 in. by 10 ft., mounted on the hoist structure scalps out the over-size, which may be wasted or fed to a 10- x 12-in. Reliance jaw crusher. After passing the scalping screen, the pit material is conveyed to the plant by a Barber-Greene 18-in. belt conveyor, 300-ft. centers. The grade of this conveyor is 20 percent and its capacity is from 60 to 70 cu. yd. per hour. A single 30-hp. G.E. induction motor drives crusher, screen and return elevator.

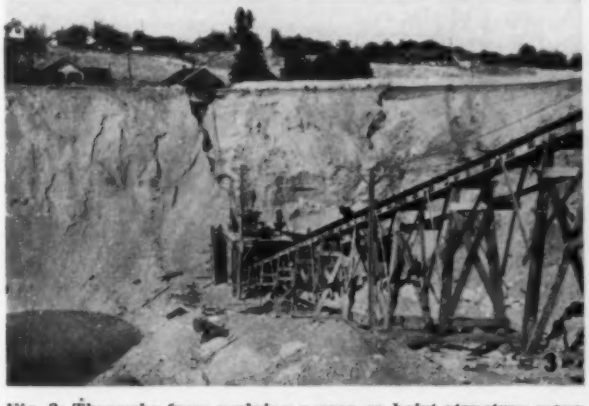


Fig. 3: Throughs from scalping screen on hoist structure move to plant on 18-in. conveyor

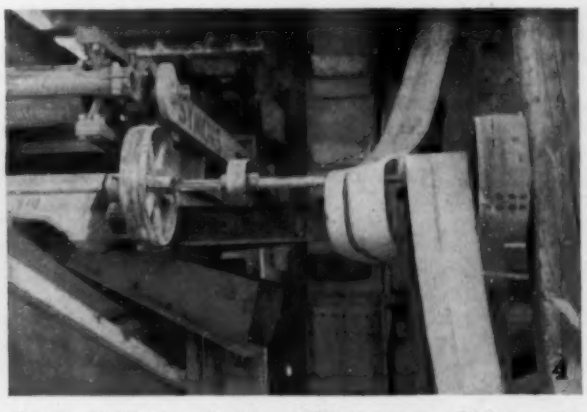


Fig. 4: At left is vibrating scalping screen which removes oversize for jaw crusher

NEWS ABOUT PEOPLE

THERON C. TAYLOR, formerly vice-president of Belle Isle Lime Co., Detroit, has been appointed sales manager of the industrial division of Standard Minerals, Inc., Detroit, manufacturer of expanded vermiculite.

•

R. C. MATTHEWS, superintendent of the Cape Girardeau plant of Marquette Cement Manufacturing Co.,

R. C. Matthews

recently passed the 30 year mark of his work with the old Cape Girardeau Portland Cement Co. and its successor, the Marquette company. He was honored with an informal program on the day of his anniversary, May 10, at the home of Manning P. Greer, safety engineer of the company. Twenty friends including foremen and officials of the company were present.

Mr. Matthews started as a worker in the mill department of the cement plant, was soon made night shift foreman, a few years later was named to head a daytime shift and in 1920 was made general mill foreman. He was made superintendent of the entire plant in 1925, which post he still holds.

His associates say he has been promoted because of constantly giving all his efforts and time to the work. Mr. Matthews has missed only a few days at the plant through the 30 years and has been active in connection with the Foremen's Club and with general activity of the company.

•

HAL S. COVERT, recently secretary of the Southern Lime Manufacturers Association, Atlanta, Ga., is now manager of the Southern States Lime Corp., Charleston, S. C.

•

NATHAN C. ROCKWOOD, Editor of ROCK PRODUCTS, has been elected chairman of the A.S.T.M.'s Committee C-7 on Lime. He has been a member of the committee for many years.

•

STANTON WALKER, director of engineering, National Sand and Gravel Association, has been elected a member of the executive committee of the American Society for Testing Materials.

•

STANLEY M. MERCIER has been appointed chief engineer of the conveyor division of Jeffrey Mfg. Co., Columbus, Ohio. He directs all conveyor engineering and engineering sales activities.

•

ALBERT E. KELLER has resigned his position as an assistant to the La Crosse, Wis., city engineer to take over the position of manager of the new Fehr Concrete Pipe Works.

•

T. F. WILLIS, chief, research division, Bureau of Materials, and M. E. DeReus, junior engineer of the Missouri State Highway Department, were awarded the Charles B. Dudley Medal at the 1940 meeting of the A.S.T.M. The award was made for their paper presented at the 1939 meeting on "Thermal Volume Change and Elasticity of Aggregates and Their Effect on Concrete." They also received the Sanford E. Thompson award by the Society's Committee C-9 on Concrete and Concrete Aggregates.

(Obituaries appear on page 80)

W. H. CARRUTHERS, engineer with the Birmingham Slag Co., has been elected president of the Engineers Club of Birmingham, Ala.

•

BURT H. BEVERSTOCK has been elected vice-president in charge of sales of Standard Portland Cement Co. with office in Cleveland Ohio.

•

GEO. H. BALFE, manager of the Monon Crushed Stone Co., Monon, Ind., is able to be around the plant again after an accident in Florida last February in which an automobile hit him while crossing a street. He was confined to a hospital and to his home for many weeks.

•

JOHN VAN NOSTRAND DORR, president of the Dorr Co., Inc., New York City, was conferred an honorary degree of Doctor of Engineering on May 31 from the South Dakota School of Mines and one on June 7 from the Michigan College of Mining and Technology.

•

CLARENCE LAMOREAUX, chemist for the Consolidated Cement Corp. at Fredonia, Kas., has been transferred to the Cement City, Mich., plant. He will be succeeded by C. J. Knickerbocker.

•

WILLIAM H. MURPHY has succeeded the late David S. Wilson as vice-president of the Searington Sand & Gravel Co., Garden City, N. Y. For the past 18 years Mr. Murphy has been active in sand and gravel plant operations around Long Island.

•

W. W. MEIN, JR., purchasing agent for the Calaveras Cement Co., San Francisco, Calif., has been appointed assistant vice-president.

W. W. Mein, Jr.

NEW MACHINERY * NEW EQUIPMENT

Preheater and Deheater For Rotary Kilns

KENNEDY-VAN SAUN MFG. & ENGINEERING CORP., New York, N. Y., has designed a stone preheater and deheater for application to rotary lime kilns. Several advantages are claimed for this equipment. A shorter kiln with less fuel consumption is possible; there is less wear on kiln liners; rings are less prominent and occur less frequently; and there is less over and under-burned lime. The cut-away sections show how the preheater and deheater operate.

Referring to the illustration, it will be noticed how the preheater and deheater function. A gusset pipe delivers the hot gases from the kiln to the limestone in the preheater. The fan draws the heated, dust-laden air through the preheater and extrudes the air in the cyclone from which the waste gases go into the stack and the recovered limestone dust is directed into storage. At the discharge end of the kiln is the deheater. The top part of the deheater is for soaking the limestone two or three hours after it has been taken from the kiln by slowly feeding it down through the deheater while cold air is drawn through the bottom for cooling the limestone.

At the right of the deheater is the coal bin and the air swept tube mill from which air is drawn by the fan, carrying the pulverized fuel to the combustion chamber at the discharge end of the kiln.

Monitor-Type Crane Cab

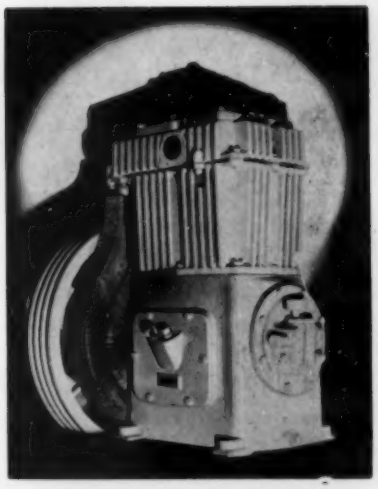
INDUSTRIAL BROWNHOIST CORP., Bay City, Mich., has announced that a recent improvement to its locomotive crane design is the patented monitor-type crane cab. It is now available on certain types of Diesel locomotive cranes, and enables the operator to see the loads better on all sides.

Another advantage claimed for this type of crane cab is the greater comfort of the operator due to the improved ventilation provided by windows opening on all four sides of his enclosure. The monitor-type cab cranes conform to standard clearance dimensions and have ample headroom for working erect in the engine compartment.

Clear vision on all sides with monitor-type crane cab

Pressure Lubricated Air Compressors

QUINCY COMPRESSOR CO., Quincy, Ill., has brought out two pressure lubricated air compressors, models 244 and 340, which are said to be specially designed for heavy duty industrial use. Model 244 is a duplex cylinder, single-stage compressor with a maximum piston displacement of 45.7 c.f.m., and model 340 is a two-stage compressor having 40 c.f.m. maximum displacement, which is recommended for services where air at higher pressures is required.



Two-stage compressor with 40 c.f.m. maximum piston displacement used where air at high pressures is desired

Lubrication on these models is provided by a gear type pump, which supplies oil under pressure to the connecting rod bearings and piston pins. The oil pump is mounted on the end of the crankshaft. Main bearings are Timkens, lubricated by a splash system which functions separately from the pressure system.

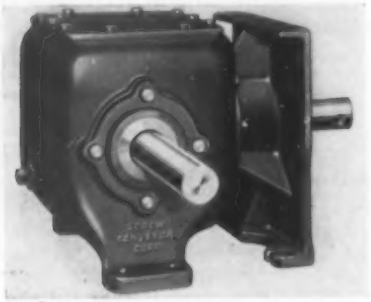
Ring type valves are used, each of which may be removed for inspection without disturbing the other valves. The two-stage model has a large copper-finned intercooler to assure maximum temperature drop between the low and high pressure cylinders. When these models are desired for automatic start and stop service they can be equipped with the patented loadless starting feature; for constant speed service the type VD unloader is available.

Shorter kiln and less over and under-burned lime with stone preheater and deheater applied to rotary lime kiln

NEW MACHINERY

Reduce Friction Losses of Screw Conveyors

SCREW CONVEYOR CORP., Hammond, Ind., introduced a screw conveyor counter-shaft box end, known as the Ace, which is said to reduce friction losses very materially. The one-piece unit houses both gears and bearings, is sealed against dirt and dust, and is considered oil-leak-proof. Roller



Screw conveyor counter-shaft box end designed to reduce friction

bearings carry all thrust and radial loads, eliminating the need of a separate thrust bearing. The box end is interchangeable with all old types, and can be furnished for wood or steel boxes in 6, 9, 10, 12, 14, 16, and 18-in. sizes.

High Discharge Point In New Truck Mixer

THE JAEGER MACHINE CO., Columbus, Ohio, has brought out a line of "high dump" truck mixers and agitators. Advantages claimed for this recently developed mixer with a high discharge point include ability to deliver concrete, low slump or high, over a wider radius, to spout it into higher forms and over material piles, and into large floor hoppers.

Other features of this truck mixer are as follows: The big mixing drums and top loading in one drop provide extra capacity. A vacuum operated discharge door requires but a flip of the finger to open or close, controls opening as desired. It is equipped with a Sypho-Meter tank with a water booster which measures water accurately within ½ of 1 percent. The water booster, winter protected, forces the water under pressure through dual revolving water sprays, throughout the mix from end to end of drum. The cab-controlled truck engine drive has the latest in power take-off, transmission, and vacuum control, operated by simple valve located in the truck cab.

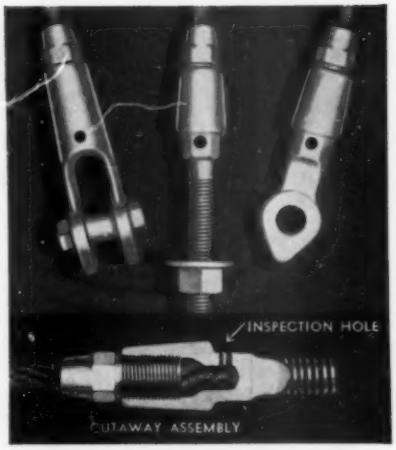
The "high dumps" are supplied in three sizes, 2-cu. yd., 3 cu. yd., and 4 cu. yd., with approximately 50 percent greater capacity when used as agitators. Heavy duty truck mixers are also made in sizes up to 6 cu. yd.

Wire Rope Connector Damps Line Vibration

ELECTROLINE CO., Chicago, Ill., has announced an improved Electroline-Fiege connector which is of vibration damping design. It is said to grip the cable with a graduated compression, feathering off from maximum at the rear to zero at the front, preventing crystallization at the point of connection thereby increasing rope life.

The connector is assembled in three simple units; a sleeve which slips over the end of the wire rope, a tapered plug which is inserted to separate and hold the strands of wire in the sleeve and a covering socket which locks the cable. A unique feature of the connector is an "inspection hole" which enables the workman to see the perfection of the twist joint, with complete bond between cable, tapered plug and sleeve.

Mixer truck with high discharge point dumping into hoppers



Three types of wire rope connectors and cutaway assembly view

For rope sizes of ¼-in. and larger, the standard connector is available in black, hot-galvanized and cadmium-plated finishes. For rope sizes ½-in. and smaller, the industrial connector is available in the same finishes and also in bronze, stainless steel and monel metal.

Small Capacity Convertible Shovel

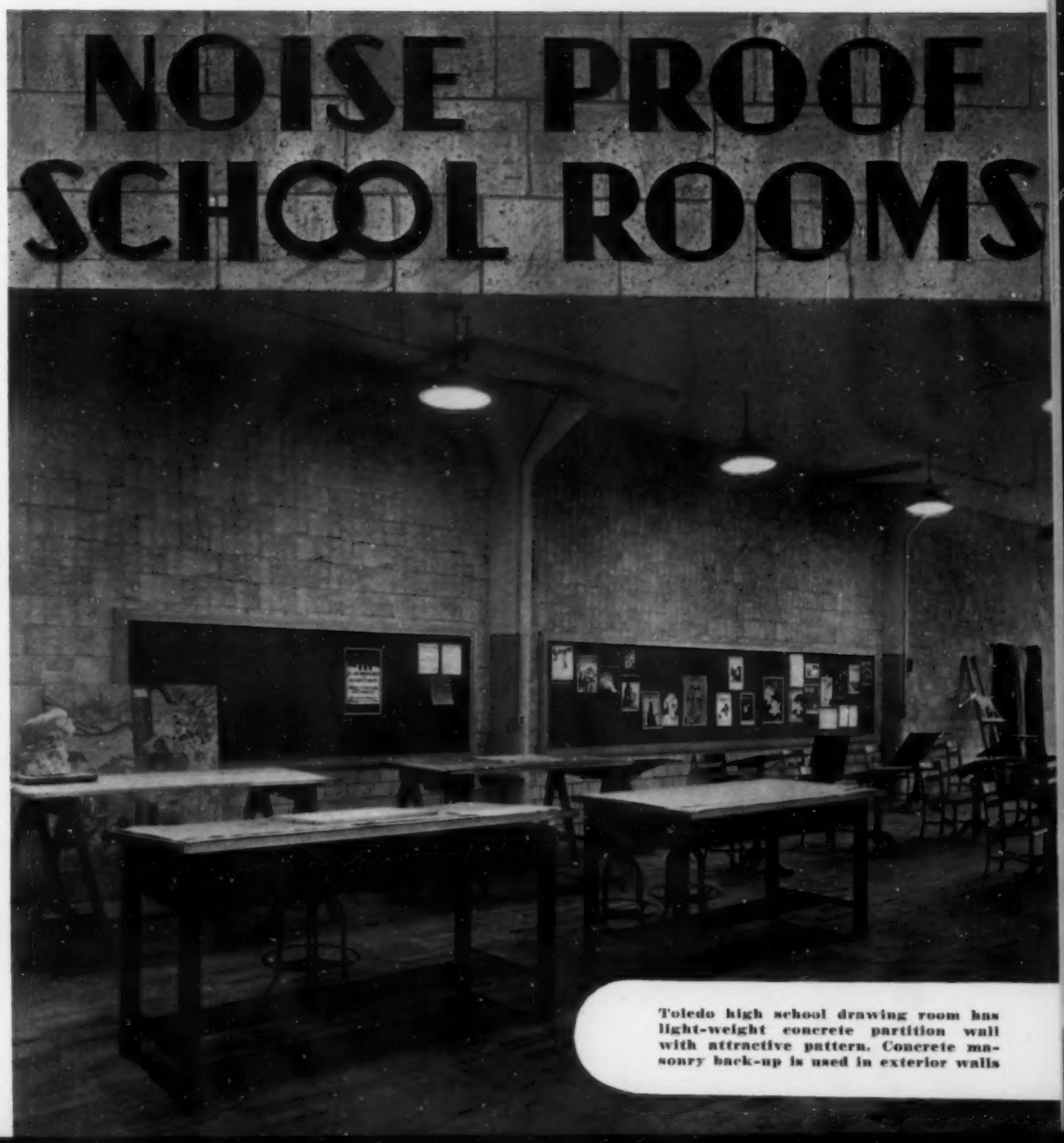
LINK-BELT SPEEDER CORP., Chicago, Ill., has a new full-size ½-cu. yd. shovel, Model LS-60, that is convertible without mechanical alteration to a dragline or crane. Among the advances claimed for the machine are self-aligning roller bearings or drum shafts, a new safety-type boom hoist for crane duty, fully enclosed traction gears running in oil and interchangeable clutches on the drum, swing, retract and boom hoist.

Small convertible shovel has two travel speeds for greater mobility

The shovel is of welded steel design and has either a 60-hp. gasoline or Diesel engine. Track shoes are 16-in. standard (20- or 24-in. optional) of the lug-driven type, or Caterpillar tractor crawlers can be furnished.

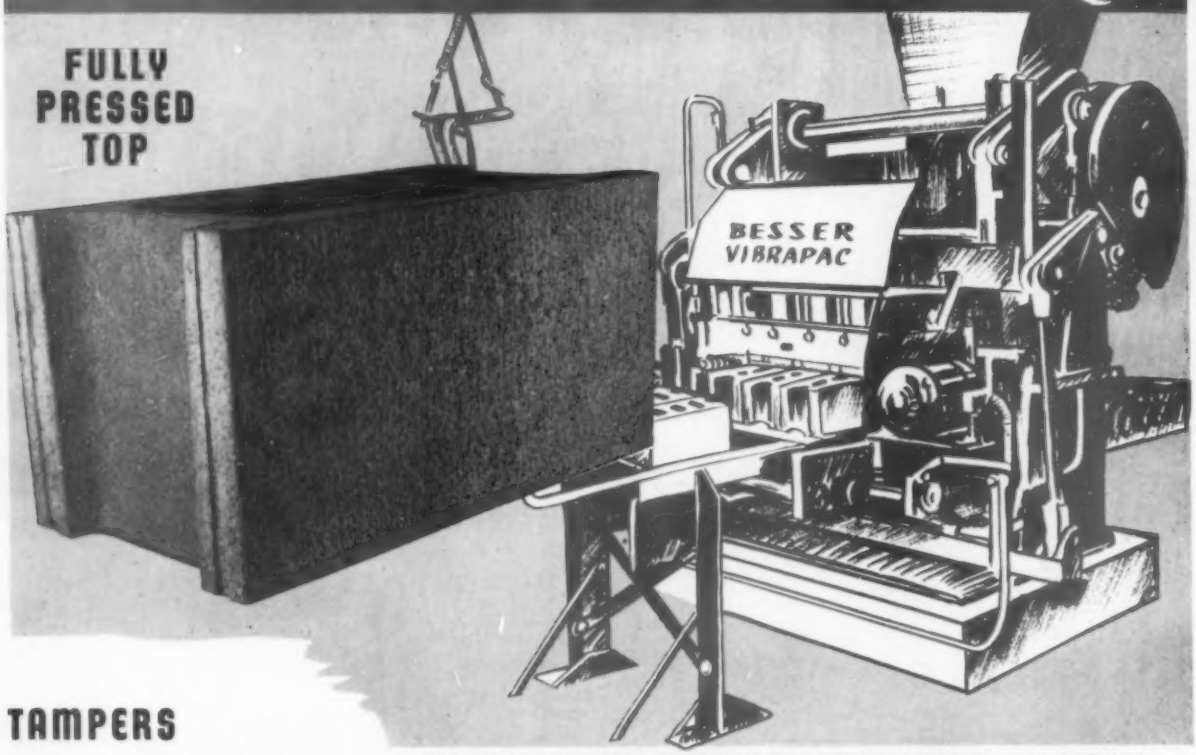
CONCRETE PRODUCTS AND CEMENT PRODUCTS

NOISE PROOF SCHOOL ROOMS



Toledo high school drawing room has light-weight concrete partition wall with attractive pattern. Concrete masonry back-up is used in exterior walls

BEAUTIFUL TEXTURE



TAMPERS

Besser Super Fully Automatic Plain Pallet Stripper with Mixer, Skip Loader, Automatic Pallet Feeder and Automatic Front Conveyor.

ONLY A BESSER VIBRAPAC CAN GIVE YOU THESE

7 BIG FEATURES

1. **Plain Pallets — The great cost saving feature — From 3 to 8 blocks made on one pallet.**
2. **Fully Automatic — No machine operator required.**
3. **One man offbearing — Power Offbearing Hoist — With no machine operator.**
4. **50% Greater Production — With one man offbearing.**
5. **Undirectional Vibration — Density and Texture controlled.**
6. **Blocks uniform in height and all other dimensions.**
7. **Strength and Durability — Simple one piece steel frame — Rubber insulation between vibrating mold and frame eliminates shocks and strains.**

BESSER PLAIN PALLET STRIPPERS

BESSER TAMPER STRIPPERS

Besser Super Automatic Plain Pallet Stripper	Daily Capacity 3000 to 4000
Besser Victory Automatic Plain Pallet Stripper	Daily Capacity 2000 to 2500
Besser Semi-Automatic Plain Pallet Stripper	Daily Capacity 1200 to 1500
Besser Champion Power Operated Plain Pallet Stripper	Daily Capacity 1000 to 1200
Besser Multi-Mold Hand Operated Plain Pallet Stripper	Daily Capacity 250 to 350

BESSER VIBRAPAC PLAIN PALLET STRIPPERS

Besser Automatic Super Vibrapac Plain Pallet Stripper	Daily Capacity 4500
Besser Automatic Victory Vibrapac Plain Pallet Stripper	Daily Capacity 2000
Besser Master Vibrapac Hand Operated Plain Pallet Stripper	Daily Capacity 800

Write NOW for details. State sizes and production wanted.

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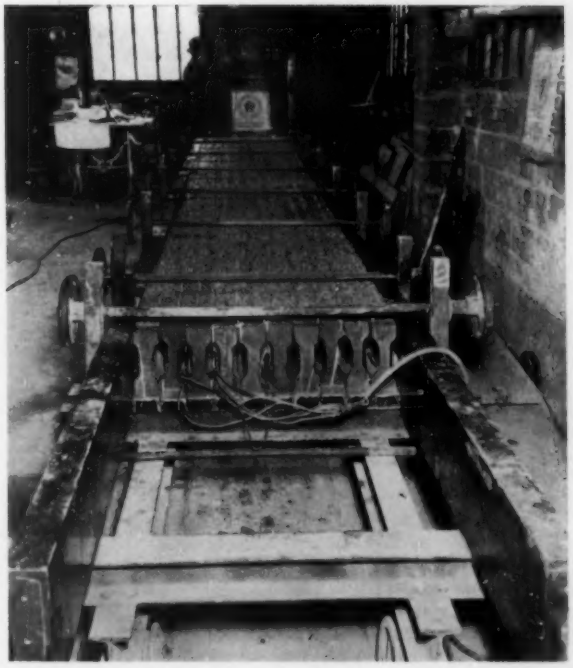
Complete Sales and Service on BESSER, ANCHOR, CONSOLIDATED, IDEAL, HOBBS, UNIVERSAL, PORTLAND

207 40TH STREET **ALPENA, MICHIGAN**

THE SAVING IN PALLET COST WILL PAY FOR A BESSER VIBRAPAC PLAIN PALLET STRIPPER

Curing Joists By Electricity

Soil cable mounted on arbors and inserted in the spaces between metal core separation plates provides uniformly applied heat to speed up curing cycle



Freshly poured concrete joists with electrical connections in the mold cores

APPLICATION OF HEAT by electricity to the freshly moulded concrete has increased precast concrete joist production for the Columbia Concrete Products Co., Toledo, Ohio. Heat, uniformly applied through the mass of concrete, combined with the use of high early strength cement, has reduced the time required for stripping joists to about half that required by the old method of placing salamanders directly under the moulds.

The disadvantage in using salamanders was that the joist manufacturing building had to be entirely closed and work on other machines had to be stopped. Labor costs to maintain the fires and the uncertainty as to temperatures produced in the concrete were other disadvantages.

Joe Nagy, president of the company, arrived at the use of electricity as the solution, after consulting Kenneth Birch, an electrical engineer with the Toledo Edison Co. It was decided to experiment with soil cable made up in the form of electrical heating coils.

About 160 deg. F. was found to be the temperature recommended for this process of speeding up the chemical action in the concrete. By experimentation it was determined that 800 watts would develop this temperature in an 8-in. joist, 20 ft. long, in one hour and 50 minutes. Heat was applied by utilizing the hollow space in the metal core separation plates between joists on the vibrating table.

It was necessary to find a way to apply 800 watts of electrical energy to the entire length of a joist without localized overheating, which meant the application of 40 watts to each lineal foot of joist. It was also essential to distribute cable and keep it from contacting metal mould plates.

An arbor was designed of 20-gauge sheet metal notched in the manner of a saw on both edges of the strip so that by winding the soil cable around it the cable was spaced evenly with 6 ft. of cable per foot of arbor. This length of cable per foot gave the proper watt density for each unit length of joist and the arbor, which is slipped through the cores, formed a support for the cable. Air is the medium of heat transfer, which assures an even distribution of heat.

Joe Nagy, president, illustrates how concrete joists are poured. Note how joist machine is moved, using stationary overhead concrete mixer and chute

Nine arbors, 20 ft. long with 120 ft. of G.E. soil cable operated with 230-volt current, are used, giving a total of 1080 ft. of cable and a connected load of 7.2 kw. In winding the cable, particular care was taken that the sharp edges of the sheet metal do not cut through the lead sheath of the soil cable. In position within each core between the moulds, the arbor is held vertically as shown in the illustration. The metal-surrounded space between joists is v-shaped at the top and bottom (in forming the web of each joist), making it unnecessary to support the arbor and also facilitating its removal.

Before adopting this method of curing, a test was made with a two-hour heating period. Three one-foot pieces of joist were cast in the middle of the joist table with small tubes

inserted in the top, middle and bottom of each of the three joists to receive thermometers. Temperature readings were taken every 15 minutes during the two-hour period. The temperature of the concrete after all the moulds were filled was 78 deg. F. At the end of the two-hour period, the temperature read 153 deg. F. in the middle section of the joist, 132 deg. F. in the top section and 116 deg. in the bottom section. Complete stripping of all joists in the mould table was found to be possible in five hours. By expediting the stripping, as compared to 10 hours using salamanders, it is possible to re-use the moulds more often, thereby increasing production.

The company operates one vibrating table of original design by Mr. Nagy, on which 10 joists are cast at a time. Twenty-foot lengths are the maximum on 8-in. joists and 25 ft. for joists 10-in. deep. The table is mounted on 24-in. gauge rails, and is filled with concrete by a spout from an overhead 7-cu. ft. stationary concrete mixer. As pouring progresses from one end of the table to the other, the joist machine is moved by a lever bar as shown in the illustration. After the application of vibration, the soil cable is connected by a plug into a 230-volt circuit and the curing cycle is begun.

The process has been found successful and is used in all conditions of outside temperature. The omission of several arbors in alternate cores is sometimes done, heat penetrating through the steel core wall and concrete to heat those joists not in direct contact with a core opening carrying an arbor.

Gravel Concern Goes Into Ready Mix Field

Battle Creek Gravel Co., Battle Creek, Mich., has announced through John Postma, president, that early in July the company will be producing ready mixed concrete. Jaeger mixers furnished by W. H. Anderson Co., Detroit, and mounted on Chevrolet trucks secured from De Nooyer Bros., Battle Creek, will be used in this new service. Batching equipment will include a Butler three-compartment bin, each compartment holding 25 cu. yd.

Universal Starts Another Pipe Unit

Universal Concrete Pipe Co., Pittsburgh, Penn., has secured a site for a new concrete pipe plant to be operated at Williamsport, Penn. A building 60- x 80-ft. will be erected to house steam drying rooms and a second structure is also planned for pipe making machinery and mixing equipment. The plant will be near the Williamsport Cement Products Co.

New Concrete Masonry Concerns

Lincoln Concrete Products Co., Lincoln, Ill., has started the operation of concrete brick and concrete block. R. E. Weaver and Walter E. Spatz organized the new company.

•

G. W. Carlson, Mora, Minn., has remodeled the Best warehouse and equipped the building with machinery to manufacture concrete block and brick.

•

Mike Trettle and Archie Matson have taken over the former Hanson Cement Block Co. plant in New Duluth, Minn. Mr. Trettle is a former contractor, and Mr. Matson is the son of M. E. Matson of the Fullerton Lumber Co.

•

Oscar Chryst, Waterloo, Iowa, has moved into his new concrete block plant which is 22- x 60-ft. It is a one-story building of concrete block construction. Mr. Chryst has been in the block business for 20 years.

VOLCANIC CINDER BLOCK

Concrete Pipe Manufacturer Operates Modern Block Plant

ADVANTAGE was taken of the heavy automobile traffic over U. S. 91 by Utah Concrete Pipe Co., Salt Lake City, Utah, in selecting the site for an office building that could be built as an advertisement of concrete masonry. The office building is 100 percent concrete masonry, painted white, and neon-lighted so that 80 percent of the traffic coming into or through Salt Lake City cannot fail to notice it.

Having such an ideal location and so attractive a "demonstration house" has added to the prestige of the company and, according to company officials, has been the means of promoting new business. Executive and sales offices are maintained there. The company can also point with pride to the offices maintained at each of its manufacturing plants.

Utah Concrete Pipe Co., operated under the name of Concrete Products Corp. until 1938, first starting in business in 1935 when the Salt Lake City plant of Massey Concrete Products Co. was taken over. This plant manufactures 4- to 108-in. diameter concrete pipe. A second concrete pipe plant is operated at Brigham, Utah, 60 miles north of Salt Lake City.

Special lift truck has pneumatic tires

In 1937, a concrete block plant was established at Provo, 40 miles south, a location near enough to the metropolitan markets and that much closer to the source of aggregates.

Semi-automatic stripper in action

Aggregate used is a reddish volcanic cinder which is dug from a deposit in Millard county and trucked 100 miles to the plant by 20-cu. yd. Diesel-powered trucks on contract. Cinders are uniform in color and composition and are low in silica, producing an 8- x 8- x 16-in. tamped block weighing only 28 lb. Units have all the desirable qualities of other lightweight blocks such as nailability, sawability, insulation value, etc.

Aggregates are stocked near the receiving hopper at the plant, but ordinarily are dumped into the hopper direct, from which a belt bucket elevator raises the aggregates to a set of 18-in. crushing rolls which reduces them to minus ⅜-in. size.

Crushed cinders are drawn from bins into a skip bucket on the floor level which is the means of re-elevating and charging a 2-sack batch concrete mixer above the block machine. The manufacturing layout is Besser designed, with a semi-automatic stripper which makes 4½ standard block per minute.

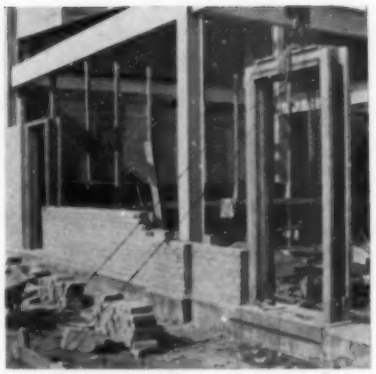
The off-bearer places blocks on wood racks which are moved into the curing kilns by a hydraulic lift truck. After a 24-in. cycle of steam curing, the same equipment is used for transfer to yard storage. Standard units made are the 8- x 8- x 16-in., 4- x 8- x 16-in., 4- x 8- x 16-in. (partition), 6- x 8- x 16-in., 8- x 12- x 16-in. and fractions thereof.

Concrete pipe are also manufactured at this plant in 4- to 30-in. diameters on a Turke-McKenzie machine. Two curing kilns are set aside for pipe and two, of 2000 block capacity each, for concrete block. George R. Jessen, president; J. C. Wright, vice-president, are officers in the company.

Above: Office building on main thoroughfare advertises company's products. Below: Large outside storage area of volcanic cinder block with plant in background

CAST CONCRETE DOOR FRAME

By T. N. HAFFNER*



Door frames being placed into position

DURING the last two years we have developed a concrete door frame for our plant use that is free from many of the disadvantages of other types of door frames and has besides certain additional good points that other types do not have. Concrete frames do not rot, rust, warp, swell, shrink, sag, curl, or peel paint. They need no paint at all, in fact, either for durability or appearance. The first cost is the last cost and once installed they can be forgotten. They are particularly suited to brick and concrete block walls, and to tile or brick interior walls. As no change in size or form occurs because of weather changes, the brick or tile lie close to the frame at all times, keeping the joint clean and weathertight. We have so far found only one disadvantage to our concrete door frames and that is weight. They are heavy, but a door frame is put in only once as a rule, although these frames might have a salvage value as they will probably outlast two buildings.

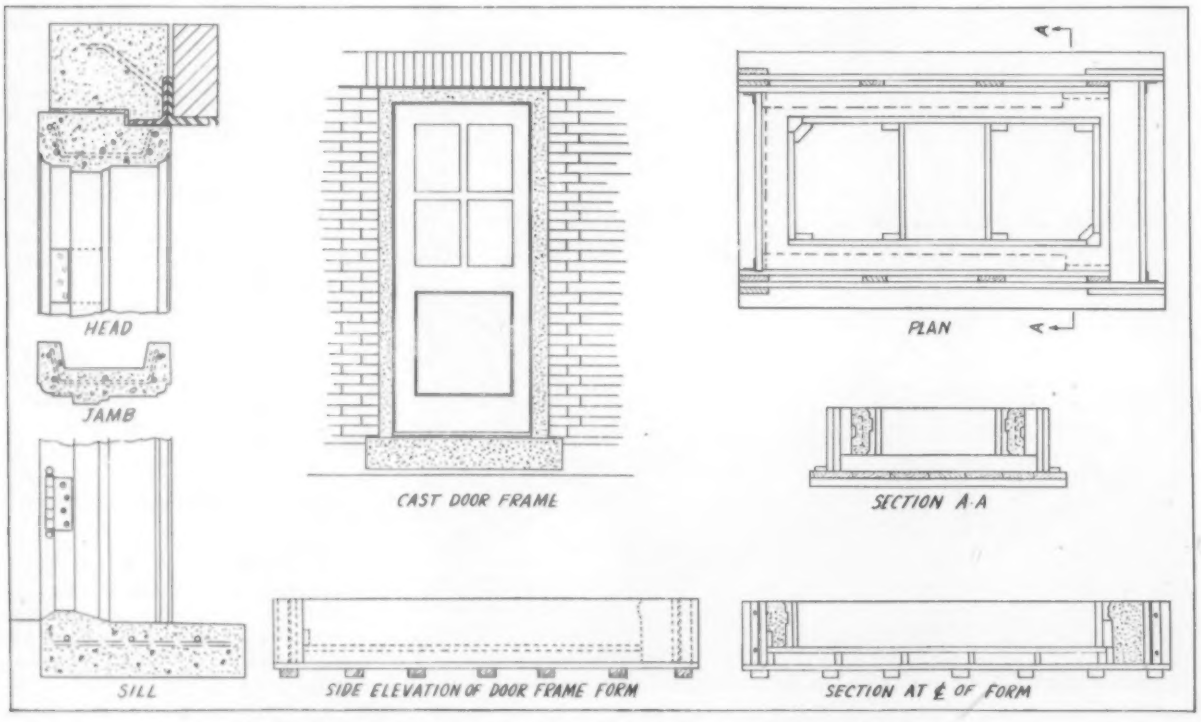
For exterior doors the whole frame including threshold, trim, and stops was cast in one piece. Interior frames were cast with sides and top only, bolt ends being left exposed on both bottom ends to hold a stiffening bar for shipment and later to serve as dowel pins. All reinforcing was kept at least 1-in. from surfaces exposed to the weather and ¾-in. on interior faces.

No ties of any kind were used on exposed surfaces, so that no patching was necessary to hide reinforcement supports. Sufficient cement was used to get a plastic mix that needed no patching on exterior surfaces and very little on other surfaces. Reinforcing bars were electrically welded at joints to avoid the little cages formed by tie wires, to have no tie wires near the surface and to have the reinforcing rigid so it would remain where placed. The mix finally used was one part of cement to four parts of coarse sand, but at first we used 1 part of cement, 2 parts of sand, 1½ parts of ½-in. crushed limestone and 1½ parts of ¾-in. crushed limestone. The cement and sand made a better casting with less work.

Steel inserts for hinges and latch were welded to the reinforcing bars. The bars were slightly bent out at these points so that the inserts would not be unreasonably heavy and also to keep the 1 in. minimum concrete covering. The inserts had been drilled and tapped for countersunk screws to fit the hardware. This might be a good place to sell a little incidental hardware, as the inserts can not be changed after the frame is cast.

The illustration shows the outside door frames for a locker room being placed and bricked in. The drawing shows the general make up, and also the mold used for casting the frames. This mold was made up of stock wood shapes and could be greatly improved. This is the first attempt in producing this particular kind of product and we are interested in seeing further development of the door frame.

* Superintendent, Keystone Portland Cement Co., Bath, Penn.



Construction details of concrete door frame and the mold in which it is cast

Double Ready Mix Capacity

Idaho contractor becomes large commercial producer of ready mixed concrete and aggregates

By I. M. DURNIN

THE Quinn-Robbins Co., located at 703 South 16th St., Boise, Idaho, recently enlarged its production capacity of ready-mixed concrete by doubling the size of the concrete batching plant and investing in other machinery. The company has been mixing concrete for commercial purposes since 1936. The plant is located on a 37-acre gravel deposit along the Boise river, adjacent to the city.

Fine and coarse aggregates are delivered to the batching plant by trucks and are then elevated to the bins by an 18-in. belt conveyor, 100-ft. centers, where it is weighed by a 5-ton capacity Fairbanks-Morse hopper scale, which is hung directly under the aggregate bins.

After being weighed, the aggregates are dropped directly into the Jaeger mixer trucks, three of which are now operating, all of 1½ cu. yd. capacity, mounted on International trucks.

Cement is carried by bucket elevator directly to the mixer. Water for the mix is raised by a small direct-connected electrically driven pump to a 500-gal. storage tank, the water from this tank being discharged to the tipple tank in any required amount for that particular batch of concrete. By opening a valve, the measured quantity of water is discharged directly into an auxiliary water tank on each mixer truck. The entire operation of weighing and measuring is ordinarily carried on by one operator.

The maximum capacity of the plant is 20 cu. yd. of mixed concrete per hour, 25 percent of which is sold to home builders. Much of the remaining 75 percent is shipped out to surrounding territory and used in street, curb and road work.

The Quinn-Robbins Co. was organized in 1923 as a general contracting firm, but branched out in 1931 with a sand and gravel plant, and in 1936 moved its washing and screening plant to the present location near the Boise River. This deposit of sand and gravel is comparatively free from overburden, the sand being of the sharp angular type. All material is taken out below the water level to an approximate depth of 21 ft. This below-water excavation requires the use of a double-drum Clyde hoist operating a 2-cu. yd. Sauerman bucket, with a ¾-in. dragline backhaul cable and a 1-in. mainline cable, operated by a 75-hp. Fairbanks electric motor. Sand and gravel are fed by a Telsmith reciprocating feeder to an 18-in. Robins belt conveyor for delivery to the screening plant.

This mechanical feeder puts the sand and gravel on a scalping screen with 1½-in. openings, the oversize going to a 15- x 36-in. Howard Cooper primary jaw crusher. This material is reduced to a 3-in. maximum, and is again elevated by belt conveyor, which discharges to a 4- x 8-ft., 3-deck vibrating screen where it is separated into three sizes and passes to bins.

All material is washed over this screen. Wash water (900 g.p.m.) is delivered to it by a 5-in. Fairbanks-Morse pump driven by 25-hp. motor.

Several sizes of aggregate are produced over this screen; the oversize gravel goes on through to a 3-ft. Symons cone crusher and is again elevated by belt conveyor to the screen, where the operation is completed.

(Continued on page 62)

Attractive office building of Quinn-Robbins Co., Boise, Idaho, with different types of ready mixed concrete trucks alongside

Left: Original batching plant where previously weighed batches had to be hoisted to a hopper

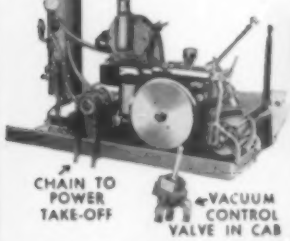
Right: New plant in which the mix is weighed out by an overhead scale and then dropped directly into mixer trucks

Now, a COMPLETE Line WITH FEATURES JAEGER

1 to 5½ Cu. Yd. HEAVY DUTY MIXERS for Steady High Production

JAEGER 2 YD. STANDARD HEAVY DUTY MIXER

THIS END-TO-END DUAL-MIXING ACTION WITH THROW-BACK BLADES PRODUCES HIGHER STRENGTH CONCRETE. Proven by authoritative Hollister Tests of over 2000 cylinders. Note reversing action of Throw-Back Blades and method of spraying water from end to end of drum.



Only Jaeger offers TRUCK ENGINE DRIVE under Vacuum Control from Cab

FASTEST KNOWN DISCHARGE — any slump — no segregation

Standard or "HIGH DUMP" . . . Insures Faster Discharge of from Properly TOP LOADED

JAEGER STANDARD TRUCK MIXERS, AGITATORS lead all others in sales because of their high production, made possible by faster, 2-speed mixing and discharge, plus wide demand for the HIGHER STRENGTH CONCRETE which Jaeger has been proven to produce. These units meet every specification or demand.

The features which have made Jaeger first choice of the ready-mixed industry are exclusive: THROW-BACK REVERSING BLADES, essential to rapid end-to-end mixing — SYPHOMETER WATER TANK, to measure accurately under road conditions, with DUAL-REVOLVING WATER SPRAYS to distribute water 100% faster and more uniformly — CAB-CONTROLLED TRUCK ENGINE DRIVE or SEPARATE ENGINE DRIVE, thru SHOCK-PROOF 2-SPEED TRANSMISSIONS giving range of mixing speeds for long or short hauls or agitation.

COMPACT DESIGN permits better load distribution and use of short wheelbase trucks. FINEST AUTOMOTIVE CONSTRUCTION results in LOWEST MAINTENANCE COSTS.

Available in sizes up to 5½ cu. yd. as Truck Mixers, up to 7½ cu. yd. as Agitators.

MORE CONCRETE IS SOLD BY JAEGER TRUCK MIXERS

# of Truck Mixers, Agitators ALONE CAN OFFER . . .

2, 3 and 4 Cu. Yd. HIGH DUMP MIXERS for Difficult Problems of Placement

2 YD. HIGH DUMP ON SHORT WHEELBASE FORD-TYPE TRUCK

the Same Mixing Action HIGHER STRENGTH Concrete Drums–New Sizes Boost Pay Load

JAEGER "HIGH DUMP" TRUCK MIXERS, AGITATORS offer advantages never before available in high discharge type truck mixers:

NEW OVER-SIZE 2, 3 AND 4 YD. DRUMS TAKE ALL THE LOAD YOUR TRUCK CAN CARRY, IN ONE QUICK DUMP THRU THE TOP — no obstructing blades or chute as on end-loaded mixers, maximum payload without crowding drum — no jeopardizing of the quality of the mix, no dead weight of loading hopper on end of drum.

FAMOUS JAEGER DUAL-MIX ACTION, with water introduced into batch at any desired time, insures faster mix and much faster discharge, especially on low slump. FLIP-OF-FINGER VACUUM CONTROLLED DISCHARGE DOOR, "WINTER-SAFETY" WATER BOOSTER, "UNI-VALVE" control of mixing, tempering and flush water, COMPACTNESS permitting 2 yd. unit to mount on short wheelbase trucks, plus 2-SPEED CAB-CONTROLLED TRUCK ENGINE DRIVE or SEPARATE ENGINE DRIVE, and other Jaeger features described on opposite page. Write today for new catalog—prices—easy, extended terms.

THE JAEGER MACHINE CO., 603 **Dublin Ave., Columbus, Ohio**

Dump into Floor Hoppers or Big Buckets

"HIGH DUMP" MEETS UNUSUAL CONDITIONS Fits into Needs of Smaller Communities as Well as Fleets of Heavy Production Mixers.

Chute into Forms Over Dirt Piles

AND AGITATORS THAN BY ANY OTHER METHOD

(Continued from page 59)

The following aggregate sizes are produced: 2½ to ¼-in.; 1½ to ¼-in.; 1 to ¼-in.; ⅝ to ¼-in.; ½ to ¼-in. gravel; washed sand, minus ¼-in.; minus 3/16-in.; and minus ⅛-in. A fine white sand is also stocked for plaster finish coats. The ¼ to ⅛-in. is a by-product removed from the various sizes of gravel to maintain a well-graded product, and is used in driveways and parking lots. Various other sizes of gravel are made to meet specifications of the Federal, State of Idaho, Ada County, P.W.A., and City of Boise governments.

The power plant consists of a 100-hp. General Electric motor which drives the Howard Cooper crusher, screen and all belt conveyors. Another 100-hp. motor, a Western Electric, drives the 3-ft. Symons cone crusher. All motors are 3-phase, 60-cycle, 22-volt type.

Equipment, covering several acres, includes the hopper, weighing machines, shovels, drag-lines, rock crushers, trucks, and much small machinery. A one-day capacity would turn out over 150 cu. yd. of concrete and 400 cu. yd. of sand and gravel.

The officers of the company are L. D. Robbins, president; Harold Quinn, vice-president; Everett McNeill, office manager and Tom McQuinn, superintendent.

The company is an extensive advertiser in local papers, having an illustrated feature in practically every week. This advertising, together with the word-of-mouth advertising done by satisfied customers, and the fact that the company guarantees its products to meet specifications are reasons to which the unusual success of the Quinn-Robbins Co. is attributed.

•

THE J. SHAW COAL AND MATERIAL Co., Kansas City, Mo., has built a new concrete batching plant and has placed in service two truck mixers.

Build Ready Mix Plant

POWELL BROS., INC., Alameda, Calif., is one of the recent additions to the ready mixed concrete producers in California. This pioneer firm was originally in the contracting business, but in recent years has been devoting all its attention to building supplies. It recently built an all-steel concrete batching plant of 200-ton aggregate capacity with two conical steel bins holding 300 bbl. of cement. Daily production of concrete is 1500 cu. yd.

•

THE READY-MIXED CONCRETE Co., Kansas City, Mo., is testing two types of mixer trucks, three vehicles in all, with the possibility that a fleet of mixer trucks will be purchased to supplement its plant mixed concrete.

•

EVANS BROS., Zanesville, Ohio, producers of ready-mixed concrete and concrete block at Zanesville and Newark, Ohio, is furnishing 170,000 8- x 8- x 16-in. sand and gravel concrete block for a Zanesville housing project. The units are being made on a Multiplex power machine at Zanesville, using calcium chloride in the mix to speed up handling, and some are being shipped in from Newark to supplement the Zanesville production.

Concrete Pipe News

THE FEHR CONCRETE PIPE Co. recently opened up its new concrete pipe plant at La Crosse, Wis. Albert E. Keller, formerly a member of the city engineer's staff, is manager of the plant. The plant is 50- x 90-ft., and has three steam rooms 16- x 50-ft. Concrete pipe from 6-in. to 48-in. and larger will be made.

•

COLUMBUS CONCRETE PIPE Co., Columbus, Ohio, has taken over an existing plant in Zanesville, Ohio, and has completely re-equipped it with new machinery to manufacture machine-made concrete pipe up to 48-in. diameter.

•

GREEN MOUNTAIN CONCRETE PIPE Co., Montpelier, Vt., has been purchased by George A. Reed, former commissioner of public works of this city. The plant was formerly operated by the late Frank H. Tracy.

Make Bomb Shelters

THE MARIETTA CONCRETE CORP., Marietta, Ohio, will soon begin the manufacture of bomb-proof shelters, according to an announcement made by Frank Christie, president. Inquiries are coming from several sources in this country and Canada.

Ideal Purchases Gulf Cement Plant

GULF PORTLAND CEMENT CO., Houston, Texas, has been purchased by the Ideal Cement Co., according to an announcement by Claude K. Boettcher, vice-president and treasurer. The Texas firm was purchased outright for a reported $800,000, and will become a wholly-owned subsidiary of Ideal. Gulf Portland Cement Co. capacity is about 1000 bbl. a day. According to Mr. Boettcher, there will be no change in operation of the plant. A description of the plant's operation appeared in ROCK PRODUCTS, October, 1938, pp. 35-40.

Plan to Build Lime Kiln in Oklahoma

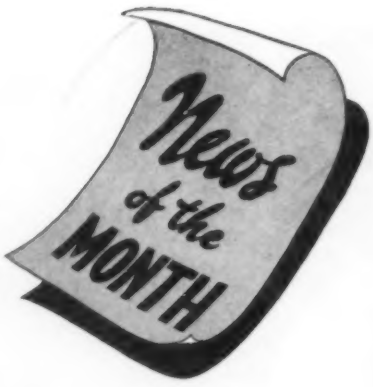
T. L. WARD and the Kansas City Southern Railway have been instrumental in a decision to locate a new lime kiln at Sallisaw, Okla., according to a local report. Homer Dunlap, Jr., Oklahoma City, has been making arrangements for the new industry. It is expected that 20 men will be employed as the initial labor force.

Open New Flux Stone Unit

LAKE ERIE LIMESTONE CO., controlled by Republic Steel Corp., has opened a new flux stone plant at Midland, Penn. Approximately $300,000 has been spent for plant and equipment which will produce 3000 tons per day. Stone deposits of the old plant were worked out and it was decided to erect a new plant at a location where the stone was ample.

Build New Sack House

SUPERIOR PORTLAND CEMENT, INC., Seattle, Wash., has started to build a new sack house to replace the old structure recently torn down. Two



contracts will be required to complete the structure, one for the building itself and the second for an elevator. Cost of the construction will be about $30,000.

Produce Crushed Stone and Gravel

CANYON ROCK CO., San Diego, Calif., has a new plant at Mission Gorge with a capacity of 1500 tons of sand and gravel and crushed stone. Officers are V. R. Dennis, president and manager; P. G. Jones, superintendent. This is a combination sand and gravel and crushed stone plant. In addition to a quarry and sand and gravel plant, a "hot mix" plant also is operated to utilize many of the sizes produced.

Riverside Activity at Oro Grande

RIVERSIDE PORTLAND CEMENT CO., Los Angeles, Calif., may reopen its Oro Grande, Calif., plant which has not been operated for several years, according to a local announcement. The Oro Grande plant had a capacity of 6000 bbl. a day. A survey was recently made of the plant and quarry.

To Rebuild Fairview Plant Razed by Fire

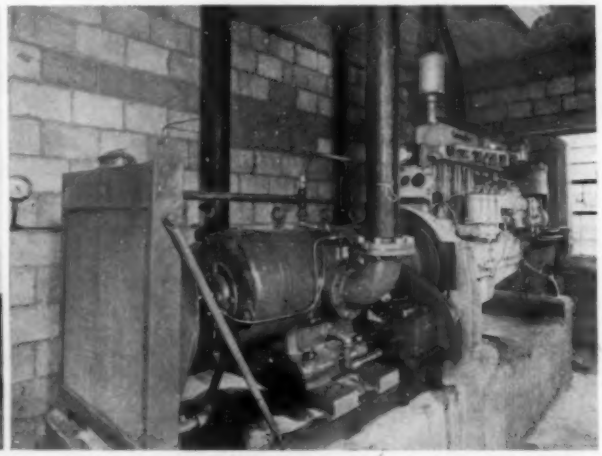
NICKEL PLATE SAND AND GRAVEL CO., Fairview, Penn., plant, which was recently destroyed by fire with an estimated loss of $50,000, will be rebuilt. Frank Welch, consulting engineer, Greenville, Ohio, has been retained to design a new plant for erection on the old foundations. The original structure was erected in 1926, according to Leon Fairchild, president and general manager, and with machinery represented an expenditure of approximately $100,000. It is believed that the fire was caused by shorted electrical wiring.

Start Up New Gravel Unit

CROWN BUILDING MATERIALS CO., Columbus, Ohio, has started operating their new sand and gravel plant on Jackson Pike. This plant, which has a capacity of 1000 tons per day, was designed and built under the direction of Fred S. Morrison, president of the company. The deposit comprises 125 acres of sand and gravel which runs about 60 ft. in depth.

Add Concrete Silos

PITTSBURGH PLATE GLASS CO., Columbia Cement Division, Zanesville, Ohio, is completing installation of new reinforced concrete silos of 75,000 bbl. capacity for the purpose of helping to take care of special cements. Improvements in the transportation system for handling cement from the silos to the packing machines are being made and three new packing machines are being placed into operation—also for handling special cements and to prevent contamination. A new unit coal pulverizer has been installed on one of the kilns.



Left: Recently completed cement storage silos of The Marquette Cement Manufacturing Co., built at Memphis, Tenn., on the banks of the Mississippi river. Capacity is 25,000 bbl. Right: Type C-110 Fuller rotary air pump for pumping cement from barge to silos is driven by a 100-hp. Caterpillar Diesel engine

ACCURATE SEPARATION

Means Increased Mill Output for the Cement Industry!

The GAYCO Centrifugal Air Separator removes all fines as they are made, thereby preventing the cushioning effect of the fine material. Coarse particles are rejected by a new type adjustable centrifugal sizing fan which is an exclusive GAYCO feature. With a GAYCO in your plant it will be easier to maintain a pre-determined circulating load and you can increase your mill capacity 25 to 40% with 25 to 30% greater recovery of fines.

It can be easily adjusted to deliver products of any desired screen analysis from 60 to 400 mesh and when once adjusted is not affected by variation of speed or rate of feed. Always produces the same uniform product at the same setting. Adjustment for any product can be noted and returned to at any time.

Let our engineers give you the benefit of their many years' experience and show you how the GAYCO Centrifugal Air Separator can pay for itself in your plant.

We also manufacture Bucket Elevators—Bin Gates—Belt Conveyors—Feeders—Grizzlies—Rock Crushers—Revolving Screens and furnish complete crushing, screening and washing plants for crushed stone or sand and gravel.

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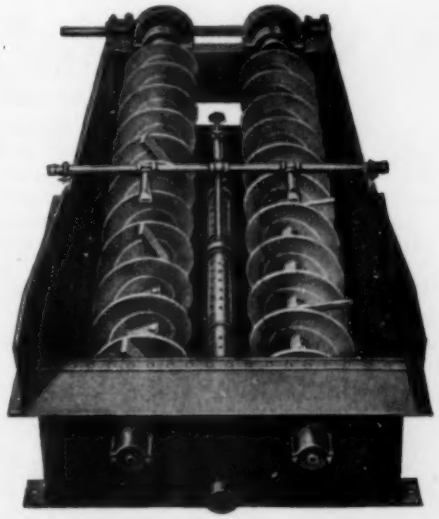
GAYCO CENTRIFUGAL SEPARATORS



MAKE YOUR SAND A *Premium* PRODUCT

Here is just the washer to give you a product that will meet the strictest specification requirements.

The sectional spiral screws draw the aggregates to the center of the tub and convey them upward to the discharge end, at the same time thoroughly scrubbing, bent bar agitators assisting the screw action. Wash water inlets arranged along the tub bottom between the two screws, carry foreign material to the surface where it is washed out with overflow water at lower tub end.

With an EAGLE SPIRAL SCREW WASHER in your plant you will be sure of aggregates with no mud, silt, coal, leaves, sticks, shale and some types of clay balls. You can also work deposits you thought impossible.

For further details write for descriptive literature on EAGLE SINGLE AND DOUBLE SCREW WASHERS, EAGLE PADDLE LOG WASHERS and EAGLE "SWINTEK" SCREEN NOZZLE LADDER.

EAGLE IRON WORKS

Des Moines, Iowa

More Masonry Cement Manufacturers

DIXIE LIME PRODUCTS Co., Ocala, Fla., has acquired the rights to manufacture masonry cements under the Blank process for the State of Florida. Knoxville Lime Manufacturing Co., Knoxville, Tenn., has acquired a similar license from the Cement Process Corp. to produce masonry cements in Tennessee. Other firms holding licenses under the Blank process include: Cementos Atoyac, S. A., Puebla, Mexico; Marquette Cement Manufacturing Co., Chicago, Ill.; Fabrica de Cemento Nacional Novella y Cia., Guatemala, Central America; Ladd Lime & Stone Co., Cartersville, Ga.; Virginia Lime Products Co., Eagle Rock, Va.; Pine Hill Lime & Stone Co., Pine Hill, Ky.

Construction Awards Ahead of Last Year

PRIVATE construction awards of the year up to June 13, totaled $453,364,000, an increase of 20 percent over the same period a year ago, according to *Engineering News-Record*. The total volume, reflecting a 26 percent decline in public construction is off 15 percent at $1,258,461,000. According to F. W. Dodge Corp., residential construction in May totaled $145,912,000, an increase of 9 percent over a year ago and the largest since August, 1929. Construction contracts awarded in May in 37 eastern states amounted to $328,914,000, the largest monthly total for the year to date and an increase of 7 percent over the same month in 1939.

Move to New Plant

FORSTER SAND & GRAVEL Co., Fullerton, Calif., recently completed a new plant south of Anaheim, Calif., on the Santa Ana River. In addition to sand and gravel, the company produces concrete block and brick. A. L. Forster is owner and manager.

Approve Sand Plant

JOHN H. ALSOP, Wakefield, Kans., has received notice of approval of his application to operate a sand plant on the Kansas river near Manhattan. The location of the plant was approved by Geo. S. Knapp, engineer for the division of water resources of Kansas.

More Cement Storage

DIAMOND PORTLAND CEMENT Co., Middle Branch, Ohio, is increasing its storage capacity for finished cement to 160,000 bbl. by construction of six new reinforced concrete silos of 60,000 bbl. capacity. The construction is for the purpose of increasing the number of storage units. The mill produces five types of portland cement.

Plant Additions

NATIONAL GYPSUM Co., Buffalo, N. Y., has filed plans for three one-story additions at its branch plant in New York to cost over $100,000.

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SOUTHERN ALKALI CORP., New York, N. Y., plans to increase its plant capacity at Corpus Christi, Texas, to cost $1,000,000 with equipment.

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UNITED STATES GYPSUM Co., Chicago, Ill., is to take bids on plans for a one-story addition to its branch plant at East Chicago, Ind., which will cost $50,000. A warehouse annex also will be built at Greenville, Miss.

New Molding Sand Unit

AYERS MINERAL Co., Zanesville, Ohio, is building a new molding sand plant near Lexington, Tenn., to produce foundry sands for industries in the South. The plant will have a 9-ft. dry grinding pan, conveyors and extensive sheds for blending sands.

Planning to Build

GEO. E. SCHNEIDER ROCK & SAND Co., Vista, Calif., is planning to build a new small sand plant. Its present plant is six miles east of Vista.

Ohio Limestone Meeting

THE PROCESSED LIMESTONE ASSOCIATION, INC., held its annual meeting June 17 and 18 at the Neil House in Columbus, Ohio. Two paramount subjects discussed at this meeting included the amount of aid to be granted the farmer in 1941 through the agricultural program of the United States Department of Agriculture and the present Ohio State legislative bill covering the licensing of various grades of limestone.

Speakers on the program were as follows: Elmer Kruse, chairman of the Ohio Agricultural Conservation Committee; Stanley Laybourne, chief of the Bureau of Feeds and Fertilizers; Dr. Robt. Salter, assistant director of the Ohio State Agricultural Experiment Station; Prof. Earl Jones of the Soils Department of the Agricultural College of Ohio.

Officers of the Association include: Frank L. Coobs, Toledo, president; Elwood Bilbert, New Castle, Penn., vice-president; Lewis Johnson, Toledo, secretary; Philip Heim, Lisbon, treasurer. W. H. Hargraf, Marble Cliff Quarries, Columbus, was in charge of arrangements.

Lime Shipments Up

NATIONAL LIME ASSOCIATION, reporting for April, has announced shipments of 91,000 tons of quicklime and 73,468 tons of hydrate. The ratio of shipments to capacity was 56.6 in April, 1940, as compared with 46.7 in March, 1940, and 49.0 in April, 1939.

Inland Wins Quarry Safety Award

INLAND LIME & STONE CO. quarry in Mackinac County, Mich., won the Sentinels of Safety trophy awarded by the Bureau of Mines as having the best record in the quarry group. The trophy is donated by the *Explosives Engineer* magazine.

Increase Highway Expenditures

Congress has passed the 1940 federal-aid highway bill, which authorizes the appropriation of $178,500,000 for highway construction for the fiscal years 1942 and 1943. Allocations are as follows:

Regular federal aid	$ 93,750,000
Secondary federal aid	18,750,000
Grade crossings	37,500,000
Forest roads	10,500,000
Public land roads	1,875,000
National park roads	5,625,000
Parkways	7,500,000
Indian roads	3,000,000
TOTAL	$178,500,000

The total shows an increase of $7,500,000 over the amount authorized by the 1938 Act.

FINANCIAL NOTES

RECENT DIVIDENDS ANNOUNCED

Alpha Portland Cem. Co.	.25	Sept. 25
Arundel Corp.	.25	July 1
Basic Dolomite, Inc.	$.12½	June 15
Ideal Cement Co.	.35	June 29
Pennsylvania Glass Sand, pfd.	1.75	July 1
Southern Phosphate	.15	July 15
Superior Portland Cem. Co. Class A	.82½	July 1
Yosemite Portland Cem. Co., pfd.	.05	July 1

PENNSYLVANIA GLASS SAND CORP., Lewistown, Penn., filed a registration statement with the SEC covering $3,700,000 first mortgage sinking fund bonds, due June 1, 1960. Proceeds of the issue, together with the proceeds of the sale of $800,000 unsecured serial notes, which the company proposes to place privately, will be applied to the redemption not later than August 23, 1940, of all outstanding first sinking fund 4½s, 1960 issue.

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BUFFALO GRAVEL CORP., Buffalo, N. Y., has been sold to Myron L. Hyman of Buffalo and the Fuller interests of Scranton, Penn., connected with the International Salt Co. Mr. Hyman's father, the late David Hyman, was at one time president of the gravel company. Mr. Hyman will be chairman of the board; Chas. F. Strasmer, Jr., will continue as president of the company; Mortimer B. Fuller, Jr., will be treasurer, and Carlton J. Lewis will continue as secretary. The company dredges sand and gravel from the lake and processes the material at a plant in Buffalo.

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MATERIAL SERVICE CORP., Chicago, Ill., reported the following consolidated income for the years ended December 31:

	1939	1938
Net sales	$10,846,189	$8,208,623
Gross profit	896,094	407,352
Depreciation & depletion	232,914	200,611
Operating profit	663,180	206,741
Margin of profit	6.11%	2.52%
Interest	69,361	48,118
Fed. income tax	129,900	.....
Net profit	463,919	†158,623

† Before Federal taxes.

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UNITED STATES GYPSUM CO., Chicago, Ill., reported consolidated sales and profits for the years ended December 31 as follows:

	1939	1938
Net sales	$43,334,697	$35,143,862
Cost of sales	24,877,819	20,695,107
Gross profit	18,456,878	14,448,755
Profit on contr.	37,839	36,645
Total profit	18,494,717	14,485,400
Sell., etc., expense	7,483,115	6,798,128
Operating profit	11,011,602	7,687,272
Margin of profit	25.41%	21.87%

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SIGNAL MOUNTAIN PORTLAND CEMENT CO., Chattanooga, Tenn., presented the following statement of earnings and sales for the years ended December 31:

	1939	1938
Net sales	$1,263,169	$994,944
Cost of sales	617,528	519,586
Selling, etc., expense	234,271	212,428
Idle plant exp.	.....	29,725
Operating profit	411,369	233,205
Margin of profit	32.57%	23.44%
Other income	12,239	d 8,463
Total income	423,608	224,743
Federal income tax	78,000	39,000
*Net profit	345,608	185,743
Preferred dividends	158,212	162,522
Surplus for year	187,396	23,221
Earned surplus, 1-1	23,221	.....
Earned surplus 12-31	170,849	23,221
Earnings, preferred, share	$17.51	$9.17
No. of preferred shares	19,741	20,255

* After depreciation: 1939, $74,943; 1938, $75,831.

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ACCORDING to our reporter, the cables shown are tellurium-rubber types in use on a coal-stripping operation. The large one supplies power at 4400 volts to a 30-cubic-yard stripping shovel.

After having been twisted in that muck and run over by trucks, neither cable showed a single leak or break. So far as we know, both are still supplying power at their rated voltages. Many other users report stories of similar harsh treatment, with similar results—little or no trouble. That's why, with tellurium, you can count on saving money by reducing maintenance cost.

If you have need for a tough cable that doesn't mind being dragged through mud or over sharp rocks and gravel, tellurium is your buy. This cable, specially designed for mining machinery, gathering locomotives, electric shovels—for all portable uses—will save you money both on replacements and upkeep.

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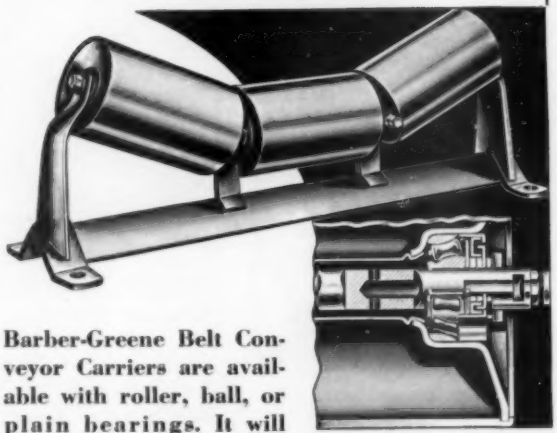

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38-2

Wage Law Exemption Granted to Crushed Stone Industry

PARTIAL EXEMPTION from the maximum hours provisions of the Fair Labor Standards Act is proposed for the northern branch of the crushed stone industry as an industry of a seasonal nature. According to an announcement from the office of J. R. Boyd, administrative director, National Crushed Stone Association, if no objections are filed within a 15-day period, the proposed exemption will become final upon publication in the Federal Register. Harold Stein, presiding officer at hearings seeking exemption, found that "in those areas of the United States that have comparatively cold winters, crushed stone plants shut down and cease operations for an extended period. More specifically, in those areas in which the average temperature during the months of December, January and February is 25 deg. F. or less, over 90 percent of all crushed stone production takes place within a six-months' period and all but a negligible amount is produced within seven months."

It was further found that since the line between the northern and southern branches of the crushed stone industry cannot be drawn for practical purposes with mathematical exactitude, it also was necessary, to give practical effect to the statutory exemption, to include within the exempted area of the industry all plants in all counties within the belt or touched by the 25 deg. isotherm. This includes all counties in the states of Iowa, Maine, Minnesota, Montana, New Hampshire, North Dakota, South Dakota, Utah, Vermont, Wisconsin and Wyoming; and specified counties in Colorado, Connecticut, Idaho, Michigan, Nebraska, New York, Illinois, Indiana, Massachusetts, Missouri, Nevada, New Mexico, Ohio, Oregon, Pennsylvania and Washington.

The counties excepted from the exemption in the various states mentioned are as follows:

Colorado: Adams, Arapahoe, Baca, Bent, Cheyenne, Crowley, Denver, Douglas, Elbert, Kiowa, Kit Carson, Lincoln, Logan, Morgan, Otero, Phillips, Prowers, Pueblo, Sedgwick, Washington, Weld, and Yuma.

Connecticut: Middlesex, New London, Tolland, and Windham.

Idaho: Ada, Benewah, Canyon, Gooding, Jerome, Latah, Lewis, Lincoln, Minidoka, Nez Perce, Owyhee, Payette, and Twin Falls.

Michigan: Berrian and Monroe.

Nebraska: Adams, Banner, Buffalo, Chase, Cheyenne, Clay, Dawson, Douel, Dundy, Franklin, Frontier, Furnas Gosper, Hall, Harlan, Hayes, Hitchcock, Jefferson, Kearney, Kimball, Nuckolls, Pawnee, Perkins, Phelps, Redwillow, Richardson, Thayer, and Webster.

New York: Genesee, Monroe, Nassau, Niagara, Orleans, Rockland, Seneca, Suffolk, Wayne, Westchester, and all the counties of the City of New York.

The following counties were exempted in the following states:

Illinois: Boone, Bureau, Carroll, Cook, DeKalb, DuPage, Henderson, Henry, Jo Daviess, Kane, Kendall, Knox, Lake, La Salle, Lee, McHenry, Marshall, Mercer, Ogle, Peoria, Putnam, Rock Island, Stark, Stephenson, Warren, Whiteside, Will, and Winnebago.

Indiana: Allen, DeKalb, Elkhart, Kosciusko, Lagrange, Marshall, Noble, Saint Joseph, Steuben, and Whitley.

Massachusetts: Berkshire, Franklin, Hampden, Hampshire, Middlesex, and Worcester.

Missouri: Atchison, Centry, Harrison, Holt, Mercer, Nodaway, Putnam, Schuyler, Scotland, Sullivan, and Worth.

Nevada: Elko, Eureka, and White Pine.

New Mexico: Colfax, Nora, Rio Arriba, Santa Fe, and Taos.

Ohio: Williams.

Oregon: Baker, Clackamas, Deschutes, Grant, Hood River, Jefferson, Lane, Linn, Marion, Umatilla, Union, and Wasco.

Pennsylvania: Bradford, Erie, Lackawanna, McKean, Pike, Potter, Susquehanna, Tioga, Warren, Wayne, and Wyoming.

Washington: Chelan, Ferry, King, Kittitas, Lewis, Okanogan, Pend Oreille, Pierce, Skagit, Skamania, Snohomish, Spokane, Stevens, Whatoom, and Yakima.

Big Stone Contract to Lime Company

MARBLEHEAD LIME CO., Chicago, Ill., has obtained a contract for its Hannibal, Mo., plant to furnish 50,000 tons of crushed stone for concrete aggregate to be used in paving route 79. Estimated total cost of the contract is $40,000. The Marblehead company was awarded the sub-contract for stone by the C. H. Atkinson Paving Co., Chillicothe, Mo.

Clinker Cooler Control Patent Agreement

FULLER CO., Catasauqua, Penn., has concluded an agreement with Harry S. Lee through which it has acquired exclusive licenses under the Lee patents covering automatic controls for the burning and cooling of cement clinker. Mr. Lee has retained the right to equip Lee coolers with these controls.

Automatic controls now available to users of Fuller Air-quenching coolers are of three types: a control of the weight of secondary air delivered to the kiln from the recuperator section of the cooler; maintenance of the secondary air at a predetermined temperature; and tempering of preheated primary air to hold the air at the desired temperature.

New Quarries Open

WHITE BLUFF QUARRY has announced that it has opened a quarry near Clarksville, Tenn., for the production of agricultural limestone. A Gruendler hammer mill with a production of 15 to 20 tons an hour has been purchased. Elmer D. Hamner is manager.

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CRYSTLINE LIME AND ORE CO. has announced that a quarry will be opened at Banning, Calif. Z. C. Griffith is the owner who negotiated a lease of the property from L. L. Barr, San Bernardino, Calif.

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MYRON BAKER CONSTRUCTION CO., Independence, Iowa, has opened up a quarry at Mokane, Mo. More than 7100 cu. yd. of stone will be required for one road contract. H. M. Climber is superintendent.

Cement Production Up

BUREAU OF MINES reports that the portland cement industry in April, 1940, produced 10,043,000 bbl., shipped 10,829,000 bbl. from the mills, and had in stock at the end of the month 25,334,000 bbl. Production and shipments in April, 1940, showed increases of 3.8 and 12.2 percent, respectively, as compared with April, 1939. Stocks at mills were 6.4 percent higher than a year ago. In the following statement of relation of production to capacity, the total output of finished cement is compared with the estimated capacity of 161 plants at the close of April, 1939, and 160 plants at the close of April, 1940.

RATIO (PERCENT) OF PRODUCTION TO CAPACITY

	April 1939	April 1940	March 1940	Feb. 1940	Jan. 1940
The Month	45.7	47.4	36.3	24.8	28.6
12 Months	43.4	47.4	47.5	47.8	47.9

Fires Destroy Gravel Plant

BRILLIANT SAND CO., Follansbee, W. Va., suffered a heavy fire loss at its local plant. Another plant is operated at Brilliant, Ohio, and the company's headquarters are at Stuebenville, Ohio.

Cement Plants Start Up

WABASH PORTLAND CEMENT CO., Stroh, Ind., has resumed operations at this plant early in June.

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MEDUSA PORTLAND CEMENT CO., started operations at its Bay Bridge plant with 165 men employed. Announcement has been made by Superintendent A. J. Little that employes who have been with the company one year or more will receive vacations.

Sand-Lime Brick Production and Shipments

NINE ACTIVE sand-lime brick plants reporting for May and nine reporting for April, statistics for which were published in June.

AVERAGE PRICE FOR MAY

	Plant Price	Delivered Price
Detroit, Mich.	....	$14.50
Grand Rapids, Mich.	....	14.00
Milwaukee, Wis.	$10.00	12.50
Mishawaka, Ind.	11.00	....
Saginaw, Mich.	10.90	....
Seattle, Wash.	14.50	16.50
Sebewaing, Mich.	10.00	....
Syracuse, N. Y.	14.00	16.00 C/L 20.00 L/C

STATISTICS FOR APRIL AND MAY

	†April	‡May
Production	1,520,430	1,587,280
Shipments (rail)	92,500	87,270
Shipments (truck)	1,809,750	2,080,448
Stock on hand	1,524,772	976,080
Unfilled orders	425,000	1,300,000

†Nine plants reporting: incomplete, one not reporting production, two not reporting stock on hand, and five not reporting unfilled orders.

‡Nine plants reporting: incomplete, one not reporting production, three not reporting stock on hand, and five not reporting unfilled orders.

Concrete Pavement Yardage

AWARDS of concrete pavement for May, 1940, have been announced by the Portland Cement Association as follows:

Type of construction	Sq. yds. awarded May	Total sq. yds. during first 5 months
Roads	5,496,148	14,519,733
Streets and alleys	2,040,593	5,279,151
Airports	47,648	448,566
Totals	7,584,389	20,247,450

BESSEMER LIMESTONE & CEMENT CO., Youngstown, Ohio, recently purchased fifteen 10-cu. yd. Easton cars for quarry use.

NATIONAL ASSOCIATION ACTIVITIES

Crushed Stone

A. T. GOLDBECK, engineering director, National Crushed Stone Association, has requested the cooperation of members in suggesting particular problems for solution through the research and laboratory facilities of the Association. The laboratory is equipped to make out-of-the-ordinary investigations on aggregates, concrete, bituminous mixtures, ballast and on problems pertaining to flexible road design.

A.S.T.M. Meeting

THE ANNUAL MEETING of the American Society for Testing Materials was held June 24 to 28, inclusive, at the Chalfonte-Haddon Hall, Atlantic City. Sessions covering Cement, Lime, Gypsum, and Concrete on June 26 and 27 were of particular interest to the industry. Committee reports included: C-11 on Gypsum, C-7 on Lime, C-12 on Mortars for Unit Masonry, C-1 on Cement, C-9 on Concrete and Concrete Aggregates, and C-13 on Concrete Pipe.

Papers presented were: "A Comparison of Mechanical and Optical Methods for Size Analysis of Cement" by P. S. Roller and P. V. Roundy; Some Properties of Mortar in Masonry" by F. O. Anderegg; "Tests of 110 Commercial Cements for Sulfate Resistance" by D. G. Miller and P. W. Mason; "A Method of Measuring Thermal Diffusivity and Conductivity of Stone and Concrete" by W. T. Thomson; "The Theory of Concrete Creep" by W. R. Lorman; "Autogenous Volume Changes of Concrete" by H. E. Davis; "Soundness of Chert as Measured by Apparent Specific Gravity and Absorption" by Chas. E. Wuerpel and E. P. Rexford; "The Absorption and Freezing-and-Thawing Tests of Coarse Aggregate" by F. V. Reagel.

Sand and Gravel

EXECUTIVE SECRETARY AHEARN calls the attention of the industry to an opinion of the general counsel of the Wage and Hour Division which holds that "wholesalers who receive goods from outside the State should consider their employes as subject to the Act even though their sales are made entirely within the State." The Division takes the position that any establishment engaged exclusively in distribution of merchandise may be considered a retail establishment if 50 percent or more of the dollar value of its sales are retail sales. The National Ready Mixed Concrete Association takes the position that the opinion is not of direct interest since that industry is a manufacturing and production industry whose status, for that reason, must be separately considered by the Division. The same position is taken by the Sand and Gravel Association, but it is often true that a retail business in building supplies is conducted. While it may develop that the courts will not agree with the Division's opinion, it seems prudent to separate from production activities, so far as maintenance of records under the Federal Wage and Hour Law is concerned, all retail business transactions.

This retail opinion of the Division refers to the decision in Wood v. Central Sand and Gravel Co., published in ROCK PRODUCTS, June, 1940, p. 40 and 41, awarding extra compensation to a watchman under provisions of the Act. This decision is believed to reflect a mistaken judicial understanding of the statute. During the period for which the fine was assessed, the company did not produce any materials and the value of its interstate shipments was only $884.36, about one-third of the amount of the fine. Interpretive Bulletin 5 of the Division states that the Act makes no distinction as to percentage of goods of employer moving in interstate commerce, and holds there is no justification for determining applicability of Act to individual employe on basis of percentage of goods he produces, or of his employer's goods, which move in interstate commerce.

However, the Wood decision seems to treat the question of percentages as an important consideration. It is understood that the company intends to seek relief in the higher courts.

COMING CONVENTIONS

National Industrial Sand Association, The Greenbrier, White Sulphur Springs, W. Va., June 13 and 14.

National Crushed Stone Association directors meeting, Homestead Hotel, Hot Springs, Va., July 11.

National Cinder Concrete Products Association, Atlantic City, N. J., August 5, 6 and 7.

National Safety Congress, Stevens Hotel, Chicago, October 7-11.

Silicosis Legislation

(Continued from page 38)

Mr. Waters' paper was on the legal aspects of current developments in industrial hygiene. The workmen's compensation laws of the states provide not only compensation for industrial injuries but also means by which State administrative agencies may effect the control of such industries, said Mr. Waters. Industry has perfected methods for engineering control in recent years, but engineering control must be supplemented by medical control in order to protect the health of employes, he said. Mention was made of programs for pre-employment and post-employment medical examinations of employes which are now being advocated by the medical profession.

The use of such examinations by an employer may avoid or limit his potential legal liability for industrial injuries that might otherwise be sustained by employes if they were engaged in hazardous occupations, said Mr. Waters. As to the legal basis or authorization for a compulsory program of such physical examinations, Mr. Waters said that in the absence of statutory prohibition an employer has the legal right to request an employe to subject himself to physical examination as a prerequisite to accepting him as an employe. However, the employer does not have the right, except by statutory provision, to require an employe to subject himself to periodic examination after he is employed. This can be done by an agreement of parties.

Many States have statutes that require physical examination of employes, he said. New Mexico, for example, requires an employe at the request of his employer to submit to an examination to determine his physical fitness. Louisiana, Maine, New Jersey, New York and Pennsylvania require pre-employment and periodic examinations of employes who are working under compressed air. North Carolina requires such examinations of all employes exposed to asbestos dust and silica dust. Missouri, New Jersey, Ohio, and Pennsylvania require monthly examinations of employes exposed to the hazard of lead poisoning and Missouri in addition requires the monthly examination of employes exposed to "substances dangerous to the health of employes."

Many occupational disease compensation statutes now provide for rules and regulations for the prevention and control of occupational diseases, and it is probable that these State departments will require compulsory examinations of employes exposed to potential hazards of occupational diseases that are compensable under the State compensation statutes.

As an example, Mr. Waters mentioned the program of physical examinations of industrial workers promulgated by the Wisconsin Industrial Commission.

Provisions of New York Code Important

Mr. Waters also discussed the proposed New York codes dealing with the control of dust, fumes and gases in certain industries. Three industrial codes have been submitted to the Board of Standards and Appeals for approval relating to the control of dust, etc., in foundries, the control of silica dust in the stone crushing industry and the control of silica dust in the stone cutting and finishing industry.

These codes are of interest not only because of their potential effect upon industrial operations in the State of New York but because of the precedent that may be established in other states.

The American Foundrymen's Association has objected to the code as prepared and after study of these objections, the National Industrial Sand Association will also register an objection to the adoption of the code in its present form. Most of the objections concern specifications for the installation of mechanical equipment in foundries.

This code sets a dust concentration of 25,000,000 particles per cubic foot of air for any foundry operation, as an injurious concentration. The concentration is not to exceed 10,000,000 particles in abrasive blast cleaning operations.

Legislative Developments

In New York State, compensation for partial disability from silicosis is denied and, until 1940, a limitation of liability for total disability was established in the amount of $500 with progressive increases at the rate of $50 monthly until a maximum of $3000 is reached. The law has been amended to increase the maximum limitation to $5000.

Considerable discussion, relating to the keeping of records which will comply with Federal Wage and Hour requirements and other matters, concluded the convention. Needless to say, the members found time to play golf as guests of the companies operating plants in West Virginia, and to enjoy other informal entertainment.

Traffic and Transportation

PROPOSED RATE CHANGES—The following are the latest proposed changes in freight rates up to and including the week of June 22:

Central

62744. **Sand** (except industrial) or gravel, C. L. Establish on, from R. A. Junction, Ohio, to Alloy, W. Va., 143c per net ton, via C. & O. Ry., Charleston, W. Va., and N. Y. C. R. R.

22605. **Limestone**, C. L., min. 80,000 lb. Establish 200c net ton, Dugan, Ky., to East St. Louis, Ill., and St. Louis, Mo.

IRC 4162-A. **Lime sludge** (in bulk), C. L., Janesville, Wis., to Decatur, Ill., cancel present rate of $2.26 per net ton, account obsolete.

IRC 8439-9. **Sand** (except industrial), in open top or closed equipment, C. L., Essex, Ill., to Burlington, Ia. Present—$2.20 net ton. Proposed—$1.56 net ton.

IRC 9094. **Sand**, C. L., from Riton, Wis., to Oak Park, Ill., cancel present rate of $1.32 per net ton account obsolete.

IRC 9099—**Cinders, sand, gravel** and strippings, C. L., from Afton and Riton, Wis., to Lombard and Villa Park, Ill. Cancel present rate of $1.21 per net ton account obsolete.

IRC 7496-6. **Sand and gravel**, C. L., in open top cars (See Note 3), from Bloomington, Ill., to various B. & O. R. R. stations in Illinois. Establish rates to following Illinois points: Bando, 97; Ashland, 97; Decatur, 108; Tuscola, 111; Newman, 124; Edinburg, 88; Pana, 111; Tower Hill, 125.

IRC 9088A. **Sand, moulding, etc.**, as described in Item 155 of C. R. I. & P. Tariff 26061-P, subject to standard min. wt., from Green River, Ill.: To East Moline, Moline, Rock Island, Ill.—Present, 97; Proposed, 66; To Davenport, Ia.—Present, 110; proposed, 66.

IRC 9119. **Sand, moulding**, min. wt. as per Item 290, Wabash Ry. Tariff I-16505, from Kinderhook, Ill. Cancel present rates shown below, account no movement: To Belleville, Ill., $1.66; Chicago, Ill., $1.94; Litchfield, Ill., $1.39; Edwardsville, Ill., $1.39; East St. Louis, Ill., $1.54; St. Louis, Mo., $1.54.

IRC 9121. **Gravel and gravel pit strippings**, min. wt. as per Item 290 of Wabash Ry. Tariff I-16505. Cancel present rates of $1.65 and $1.75 from Peoria, Ill., to Quincy, Ill., account no movement.

IRC 9122. **Gravel and gravel pit strippings**, min. wt. as per Item 290 of Wabash Ry. Tariff I-16505, Springfield, Ill. (when originating at Pekin, Ill.), to Riverton, Ill. Cancel present rate of 69c per net ton account no movement.

IRC 9123. **Sand, sand pit strippings, gravel and gravel pit strippings.** Cancel present rate of 84c per net ton from Hamilton, Ill. (East Keokuk), to Carthage, Golden, Timewell, Mt. Sterling, Ill., account no movement.

Southwestern

20764. **Stone, crushed.** Establish a commodity rate of $6.05 per ton of 2,000 lb. C. L. (See Note 3), from Lyons, Colo., to Ponca City, Okla., routing C. B. & Q., Denver, Colo., C. & S., Sixela, Tex.-N. M., F. W. & D. C., Amarillo, Tex., C. R. I. & P. or P. & S. F.-A. T. & S. F.

4821. Establish following rates on **sand and gravel**, from Hillsdale Pit, Texas: To Bledsoe, 105; Brownfield, 100; Lamesa, 100; Lubbock, 85; Seagraves, 100; Whiteface, 100.

4861. **Sand and gravel.** Carrier's proposal to establish rate of 50c per ton of 2000 lb. on sand and gravel, in straight or mixed C. L., from Edgin, Texas, to Plainview, Texas.

Southern

20835. **Slate, crushed or ground or broken slate**, publish a rate of $2.25 per net ton from Mena, Ark., to Ft. Worth, Tex.

20846. **Sand.** Establish rate of $2.49 per ton on silica sand, description and min. wt. as per Item 1020 of S. W. L. Tariff 162-O, from Guion, Ark., to Chattanooga, Tenn.

22544. **Sand**, C. L. Establish from Blue's "Y" Siding, N. C., to Camp Polk, N. C., 85c; Charlotte, N. C., 69c; Greensboro, N. C., 95c; Henderson, N. C., 100c; High Point, N. C., 105c; Raleigh, N. C., 85c net ton. Truck competitive.

22550. **Silica (silex) sand, silica, ground, powdered or pulverized**, C. L., min. 60,000 lb. Establish to Corning, N. Y., from Spruce Pine and Minpro, N. C., 31c, and Erwin, Tenn., 30c cwt.

22504. **Lime, fluxing**, C. L., min. 70,000 lb. Establish 360c net ton—Burns, Tenn., to Black Fork, Ohio.

22564. **Sand and gravel**, C. L. Establish 70c net ton, Kay, N. C., to Durham, N. C. Truck competitive.

22595. **Sand and gravel**, C. L. Establish 95c net ton, Kay, N. C., to Plymouth, N. C. Truck competitive.

22671. **Sand and gravel**, C. L. Establish 75c net ton, Columbia and Waters, Miss., to Pontotoc, Miss.

22676. **Sand and gravel**, C. L. Establish 95c net ton, Kay, N. C., to Greensboro, N. C. Truck competitive.

62689. **Feldspar**, crude or ground, C. L., min. wt. 60,000 lb. Establish on, from Bancroft, Ont., to Cleveland, Ohio, 27c. Routing: As per C. N. Rys. Routing Guide No. G. 10.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

Note 4—Reason: No present or prospective movement.

Note 5—Reason: Comparable with rates from other origins in immediate vicinity.

Note 6—Rates will not apply on shipments in cars with tarpaulin or other protective covering. In such instances the rates applicable on shipments in box cars are to be assessed.

Note 7—The oil, tar or asphaltum not to exceed 10% of weight of the commodity shipped, the shipper to so certify on shipping order or bill of lading.

OBITUARIES

EDWARD D. HAMMOND, one of the founders of the Chicago Gravel Co., Chicago, Ill., died recently at the age of 87.

•

C. RUDOLPH SCHOENHUT, one of the first chemists employed by the Atlas Portland Cement Co. at Northampton, Penn., now the Universal Atlas Cement Co., died May 20 at Fullerton, Penn.

•

E. L. GREGORY, an outstanding figure in the Tennessee phosphate business during its first 15 years, passed away in Ardmore, Okla., May 28 at the age of 87.

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HERMAN GREENBERG, president and founder of the Lincoln Crushed Stone Co., Joliet, Ill., died June 2. He was 68 years of age and founded the company 30 years ago.

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WILLIAM S. BUCKLAND, president of the Philadelphia Slag Co., Norristown, Penn., died May 30 at the age of 66. He was born in Hokendauqua, near Allentown, and entered the slag business with a brother in Reading after leaving school. In 1907 he established the present company.

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CHARLES J. PHIFER, chemist for the Lehigh Portland Cement Co., died May 27 in Bethlehem, Penn., at the age of 68.

New Incorporations

Delhi Flourspar Corp., Marion, Ky., has been incorporated by H. F. McVey, J. L. Gregory, L. P. Strange and Mrs. E. M. Ziegler.

Commercial Sand & Gravel Corp., Camden, N. J., has been granted a charter with a capital of $2000. Agent is Howard R. Yocum.

Hillsborough Sand & Material Co., Tampa, Fla., has been incorporated with a capital for 100 shares, $100 par value. Directors are A. Haworth, B. M. Robbins, and M. Robbins.

McVaugh Ready Mixed Concrete Co., Inc., East 19th St. at McKinley, Anderson, Ind., has been granted a charter capitalized at 150 shares no par value. Incorporators are William F. McVaugh, Claude P. Myers and M. A. Neville.

Santa Paula Rock Co., Los Angeles, Calif., has been incorporated by Walter O. Scheel, J. H. Wheeler and Elta Thompson with a capitalization of $50,000.

Vacuum Concrete Co. of Ohio, Inc., Cincinnati, has been granted a charter. Capital is $25,000 and incorporators are Milton H. Schmidt, Harry Kasfir, and Donald A. Fisher.

Smithtown Gravel Corp., Kings, N. Y., has been granted a charter. It is capitalized at $10,000 and the agent is Chamow & Goldberg, 66 Court St., Brooklyn.

Mid-West Concrete Products Co., Inc., 921 Broadway, Gary, Ind., has been granted a charter, capitalized at 75 shares no par value. Albert H. Gavitt, Mildred Collie and Germaine Waltzer are incorporators.

Transit-Mix Concrete Co., Charlotte, N. C., has been incorporated by Floyd M. Simmons, Eleanor A. Simmons and Ivy L. Brown. Authorized capital stock is $30,000 and subscribed stock is $300.

Alpha Sand and Gravel Co., Alva, Okla., has been incorporated with a capital of $10,000 by E. H. Ridgway, H. E. Bocock, and C. E. Schaefer.

Marion Rock Co., Coquille, Ore., has been incorporated by Walter E. Marion, C. D. Christianson and L. D. O. Donnell for $100,000.

Manufacturers' News Notes

Timken Roller Bearing Co., Canton, Ohio, announces the appointment of William Taggart as manager of tube sales.

Easton Car & Construction Co., Easton, Penn., except for a skeleton force, will be closed for the annual summer vacation from June 28 to July 11. This has been the company's practice since 1920.

Chain Belt Co., Milwaukee, reports the death of William H. Quinn, New York district manager. He had been with the company since 1923 and manager of the New York office since 1928.

Chicago Bridge & Iron Co., Chicago, Ill., has moved to new quarters at 332 S. Michigan Ave. They contain approximately 40 percent more area and are completely remodeled and equipped with new furniture throughout.

National Industrial Advertisers Association, Chicago, reports that sponsorship of the 1940 N.I.A.A. industrial advertising budget survey will be conducted under the supervision of E. J. Goes, N.I.A.A. vice-president in charge of national activities and advertising manager of Koehring Co., Milwaukee, Wis.

Classified Advertisements

CLASSIFIED RATES

POSITIONS WANTED — POSITIONS VACANT—Set in six-point type. Minimum $1.00 each insertion, payable in advance.

INFORMATION—Box numbers in care of our office. An advertising inch is measured vertically in one column. Three columns, 30 inches to the page.

CLASSIFIED — Displayed or undisplayed. Rate per column inch, $5.00. Unless on contract basis, advertisements must be paid for in advance of insertion.

CONSIDER THESE CONSOLIDATED VALUES!

AT CASTALIA, OHIO

8'x125', 6'x120' and 9'x60' ROTARY KILNS.
5—DIRECT HEAT ROTARY DRYERS; 4'6x50', double shell; 4'x60', 6'x60'.
2—5'x10' BONNOT BALL MILLS, steel lining, with motors.
3—5'x22' TUBE MILLS, silex, with motors.
1—6'x30" HARDINGE CONICAL BALL MILL, iron lined, with motor.
3—5'x27' TUBE MILLS, silex, with motors.
1—12' dia. DRY GRINDING PAN.
4—18 ton STEAM LOCOMOTIVES, Vulcan and Porter, 36" ga.
200—1½ yd. two-way STEEL DUMP CARS, 36" ga.
1—5 ton TRAVELING CRANE, 70' span, 300 ft. long.
1—20 ton BROWNING LOCOMOTIVE CRANE.

SYMONS CONE CRUSHERS
5½ Ft. and 7 Ft., Fine Bowls.

GYRATORY FINISHING CRUSHERS
No. 410-TZ Traylor, 4 ft. head; No. 25, No. 37, No. 49, Kennedy, all direct motor driven; 3' TZ Traylor.

ROTARY KILNS
9'x160', 8'x150', 8'x125', 6'x120', 6'x60'.

ROTARY DRYERS—Direct Heat
Ruggles-Coles, double shell; 5'x26', 5'x30', 5'6x60', 80"x45, 104"x60', 104"x85', Single shell: 4'x30', 5'x30', 6'x40', 6'x50', 6'x60', 8'x60'.

CENTRIFUGAL AIR SEPARATORS
10' Sturtevant; 8', 10', 12' Gayco—also 5' dia. Raymond "Whizzer" for attachment to roller mill.

RAYMOND PULVERIZERS
2 Roll and 3 Roll High Side—4 and 5 Roll Low Side; No.'s 0000, 00, 1 and 3, Beater type—Also No.'s 55, 60, 90 Imp type.

HARDINGE CONICAL BALL MILLS
3'x8", 5'x22", 6'x22", 7'x22", 8'x30", 8'x72".

BALL, ROD AND TUBE MILLS
Ball Mills: 3'x5', 5'x10', 6'x6', 6'x8'.
Rod Mills: 4'x8', 6'x12' Hardinge, straight side; 5'x10', 5'x15' Allis Chalmers.
Tube Mills: 3'x12', 4'x16', 5'x20', 5'x22', 5'x35'.

VIBRATING SCREENS
Tyler Hummer 3'x5', 4'x5', 1 and 2 decks; 4—4'x7' Leahy, two deck; 4'x8' Huron, 1 deck; 3—5'x10' Symons, 2 deck; 3—4'x7' Jeffrey-Traylor, 2 deck; Also Rotex, Robinson and other makes.

AIR COMPRESSORS
1—INGERSOLL RAND 315-A PORTABLE COMPRESSOR.
2—INGERSOLL RAND 830 cu. ft. Air Cooled, electric driven COMPRESSORS, 100 lbs. 1939.
1—CHICAGO PNEUMATIC OCE 20x12x14 COMPRESSOR, synchronous motor.

RBAD ROLLER
1—BUFFALO SPRINGFIELD GASOLINE ROLLER, with Scarifier—10 ton, 3 wheel, rear tires 24" wide, new 1939.

We are also able to offer other sizes of Jaw, Gyratory and Roll Crushers; Gyratory Finishing Crushers; Shovels, Cranes and Draglines; Locomotives; Vibrating Screens; Elevators; Conveyors; Pulverizers; Ball, Tube and Rod Mills; Filters; Air Classifiers; Dorr Classifiers; Air Compressors, etc.

SHOVELS AND CRANES
1—No. 19-B BUCYRUS-ERIE GASOLINE SHOVEL, ⅝ yd. 1939.
1—1½ yd. LORAIN SHOVEL, D-13000. Caterpillar Diesel Shovel, 1936, double drums.
1—No. 37-B BUCYRUS-ERIE DRAGLINE, new 1939. Caterpillar Diesel Motor.
1—BUCYRUS-ERIE No. 48-B DIESEL DRIVEN SHOVEL, 2 yd., full revolving, 1937.
1—2 yd. MARION No. 381 COMB. SHOVEL AND CRANE, Buda Diesel, 1937.
1—NORTHWEST 2½ yd. DIESEL DRIVEN SHOVEL, full revolving, 1937.
1—BUCYRUS-ERIE 2 yd. 50-B STEAM DRIVEN DRAGLINE CRANE AND SHOVEL. Aluminum dragline boom and little used shovel front.
1—TRUCK CRANE "Universal", 7½ ton.

LOCOMOTIVES
2—DIESEL DRIVEN 8-ton, 36" ga. LOCOMOTIVES, D-4400 Diesel motors.
2—DIESEL DRIVEN 4½ ton, 36" ga. LOCOMOTIVES, Buda Lanova motors.
4—18 ton STEAM LOCOMOTIVES, Vulcan and Porter, 36" ga. Near Cleveland, Ohio.

COMPLETE SILICA PLANT FOR SALE
Located at Collinwood, Tenn., 20 miles from Muscle Shoals or Florence, Ala. For operation at present location or removal. Consists of Jaw Crusher, 4x20' Rotary Dryer, 6x22' Hardinge Mill, 5' Gayco Separator, 200 H.P. Diesel Engine, Elevators, Conveyors, Screens, Pumps, etc.

CONSOLIDATED PRODUCTS CO., Inc., 15-16-17 Park Row, New York, N.Y.
Our Shops at Newark, N. J., cover eight acres

LIQUIDATION SPECIALS

4—330 cu. ft. Metalweld-Worthington air compressors, gas, portable.
1—820 cu. ft. Sullivan air compressor, Type WK 314, gas, portable.
1—220 cu. ft. Sullivan air compressor, Type WK 314, gas, portable.
3—110 cu. ft. Sullivan air compressors, Type WK 312, gas, portable.
2—110 cu. ft. Metalweld-Worthington compressors, gas, mounted on 1½ ton Ford Model A dual pneumatic trucks.
2—110 cu. ft. Sullivan air compressors, Type WK 312, gas, mounted on 1½ ton G.M.C. dual pneumatic trucks.
1—90 cu. ft. Ingersoll Rand air compressor, gas, mounted on 1½ ton Model A dual pneumatic truck.
Concrete batching plant, 5 compts., 1000 yds. aggregates, 750 yds. cement, automatic weigh batcher.
Robinson bulk cement unloader, air.
155 bbl. Fuller cement bin, electric batcher.
Blaw Knox 270 bbls. bulk cement plant, complete.
72 ton Blaw Knox steel bin, portable, 2 compts.
50 ton Blaw Knox steel bin, portable, 2 compts.
42 cu. yds. Beaumont steel bin, 2 compts.
Fuller Kinyon bulk cement unloader, portable.
Fuller C40 rotary air compressor, electric.
Gyratory crushers: K.V.S. 30, 37-S, 49; Telsmith 33; SA, 8D; Traylor 8"; McCully 12", 9", 6".
Jaw: 6x12, 9x16, 10x20, 12x26, 13x30, 15x30, 16x32, 36x48, 48x60.
Jeffrey Type A 20" x 24" pulveriner.
Apron feeders, 18" x 6', 24" x 6', 48" x 14', 5' x 15'.
Bucket elevator, 65', chain, buckets 24"x12"x17¾".
Robbins, 4x8 double deck Gyrex vib. screen.
Telsmith 4'x10' single deck vibrating screen.
Gayco 8 ft. air separator.
Whirley 25 tons cap., 85' boom, electric.
41-B Bucyrus Erie comb. crane and shovel. Steam.
50-B Bucyrus Erie steam shovel.
Browning 10 ton crane, gas, 40' boom.
Blaw Knox single line clamshell bucket, ¾ yd.
Hayward 1 yd. clamshell bucket, rehandling.
8—Barber Greene conveyors 24"x35', type N.
4—I.R. wagon drills, FM-2, pneumatic tires.
I.R. quarry bar, complete with I.R. X-71 drill.
Caterpillar tractor, Model 20, bulldozer, gas.
I.R. Model 50 Leyner drill sharpener.
Stiff leg derrick, steel, 20 tons, 97' boom.
Steam hoist, 10"x12", 3 drums, Lidgerwood.
Stiff leg derrick, steel, American, 15 tons, 90' bm., with 3 drum American 125 HP electric hoist & swinger.
Clyde 3 drum electric hoist and swinger, 75 H.P.
Bauerman 4 yd. dragline hoist, 150 HP, electric.
Bauerman two drum dragline hoist, 75 HP, gas.

RICHARD P. WALSH
30 Church Street, New York, N. Y.

CRUSHERS

GYRATORY: 42" McCully with 80% brand new parts. 36" Allis-C. 20" Super. McCully conv. to 18". Gates Nos. 10, 9, 8, 7½, 6, 5, 4, 3, 2, 1 (75 avail.) Telsmith Nos. 4, 5, 6, 6C, 9 & 16. Also Many Austins, Kennedys and Traylors, many sizes.
JAW TYPE: Traylor 60x84, 48x60, 42x48, 24x72, Superior 84x66 & 24x36. Buchanan 30x42. Farrel 60x42, 30x36, 24x36, 18x36, 12x24. Good Roads 1030. Acme 24x40. Misc. 7x12, 9x16, 8x20, 8x24, 12x24, 9x36, 9x20, 15x36.
REDUC. TYPE: Kennedy Nos. 25, 37 & 49. Telsmith 3-F & 40. Traylor 36" TZ, 8", 10", 12" Super. McCully 6" & 10". Newhouse 5, 7 & 10". Symons Cone & Disc Ty. 2' to 4'.
ROLLS: Allis-C. 12½x12, 36x16, 40x15, 54x24 & 72x30. Fairmount 36x60 & Jeffrey 24x24 to 36x54 single roll. Cornish 36x14 & 42x16, Etc., Etc.
HAMMERMILLS: Williams No. 1, 2, 3, 4, 6 & 9. Jeffrey 36x18 & 36x42. Day Nos. 20 & 40, Etc.
MILLS: Kennedy Ball 4x6, 5x6 & 5x8. Marcy 8x6 & 10x9. Hardinge 6'x3', 6'x30' & 6'x9'. Misc. Tube Mills 5' & 6' x 22'. Sturtevant Ring Roll, Raymonds, Kents, Fuller-Lehigh, Etc., Etc.
CRUSHING PLANTS: No. 65 Diamond. No. 23 Pioneer 8x24. 1030 Good Roads, 9x40 Austin-Western, 9x36 C.R.

MISCELLANEOUS ITEMS
Barges, Bins, Buckets, Boilers, Cableways, Cars, Compressors, Conveyors, Cranes, Dryer, Derricks, Draglines, Drag Scrapers, Dredges, Drills, Engines, Elevators, Excavators, Generators, Hoists, Kilns, Locomotives, Loaders, Motors, Pipe, Pumps, Rail, Scales, Screens, Slacklines, Shovels, Tanks, Trucks, Tractors, Etc., in many sizes, types and makes at low prices. **(I have equipment at many points in the United States and Canada. What you need may be near your plant.)**

ALEXANDER T. McLEOD
7229 Rogers Avenue CHICAGO

◆ ◆ ◆

CONVEYORS: 12 to 36" Belt-Idlers-Pulleys
Stat'y. 12"x50', 12"x80', 24"x100 & 200'
Portables 14"x40', 16"x20', and 18"x30'
36" L-B. Self-Contained Apron Feeder
24" B-G. Electric Plate Feeder

SCREENS: 4x8' 2-deck Gyrex Vibrating
4x8' 2-deck Heavy Duty Perfex Vibrating
6—4x8' 1-deck Hummer Vibr., 2-unit V16
4x5' 1-deck Hummer Vibrating, V-16 & V40
120 New 3x5 & 4x5 "Ton-Cap" Screen Cloth
12-KVA Motor Generator for Hummer Screen
3x8' 1-deck Link-Belt Vibrating, Belted
3x5' 1-deck Deister Multirap Vib., Belted
42"x20' Revolving—30" Telsmith Grizzly

BUCKET ELEVATORS: 14"x50', 20"x30', and 24"x40' Continuous Inclined.
10"x40' On Chain. 6"x50' On Belt Encased Casings, Buckets, Drives, Chains, Belts

CRUSHERS: 9x15, 9x16, 10x20, 10x24, 12x16 & 24x36-B Jaw. 15"x18" Jeffrey Pulverizer 28x30 Robins Heavy Duty Crushing Rolls
2—12x10 New Holland Double Cinder Roll
12" Traylor Gyratory

COMPRESSORS: 45' & 260' Belted Types
12x12x12 I-R Steam-Air.—Portable Units

TRACK & CARS: 16—24"-g. 1-yd. V-Cars
7—24"-g. Atlas ½-yd. End Dump Cars
2—30"-g. Mercury Battery Locomotives
36"-g. V-shape End Dump Car, 2-yd. cap.

MISCELLANEOUS: ½-yd. Speeder Gas Shovel
50 & 60-hp. Waukesha Gasoline Engines
2—drum Stroudsburg Builders Gas Hoist
Cletrac No. 40 Caterpillar Tractor, Gas
Clamshell Buckets—¾, 1, 1½, & 2½-yards
Dragline Buckets—½, 1, 1½-yards cap.

G. A. UNVERZAGT
15 PARK ROW, NEW YORK CITY

FOR SALE—ICE MACHINE

One 8-ton Frick Ice Machine in excellent condition, with ammonia condenser, valves, pipe and fittings.

STANDARD EQUIPMENT & SALVAGE CO.
2501 First Avenue, North
Birmingham, Alabama

Electrify your crane or shovel with our modern equipment, 60 H.P. high tongue Slip Ring Motor, base resistance, magnetic switch, all wiring and conduits for Silent Chain.

50' Swintek Cutter 10" or 25'8". (Can be extended to any length.)

8" Morris Manganese Steel Pump—NEW.

BROADWAY CONSTRUCTION CO.
14005 BROADWAY, CLEVELAND, O.

WE BUY, REBUILD, SELL OR RENT

AIR COMPRESSORS

Portable and stationary, belt with elec. or gas power, sizes from 20 cu. ft. to 1,000 cu. ft.

BINS

9—2 compartment bins; 2—118 ton Blaw Knox; 1—75 ton Butler V-40; 3—72 ton Blaw Knox; 1—40 ton Butler V-40; 1—35 ton Blaw Knox portable 1—26 ton Heltzel portable with Kron dial scale. All above with or without volume or weigh batchers.

BUCKETS

26—Clamshell, all sizes and types; Williams, Blaw Knox, and Owen.

6—Draglins: 1—1⅝ yd. Northwest; 1—1½-yd. Omaha; 1—1¼ yd. Page; 2—1 yd Hayward; 1—⅝ yd. Page.

1—1½ yd. Pioneer Cableway Excavator bucket.

7—Dragscraper: 2—1 yd. Sauerman; 1—1 yd. Green; 1—⅝ yd. Garst; 3—¼ yd. Garst.

CONVEYORS & ELEVATORS

4—Steel frame belt conveyors: 3—18" Barber-Greene 60', 45' & 24'; 1—National 18"x30'.

11—Bucket elevators: Rex and Weller, on chain or belt; all sizes.

CRANES, DRAGLINES & SHOVELS

1—Link Belt Mod. K-55 combination dragline and shovel Ser. No. 1698, gasoline power, 70' dragline boom, 2 yd. shovel frame.

1—Page, Model No. 411 Diesel crawler dragline, 70' boom, 2 yd. bucket.

1—P & H Model No. 650, Serial No. 4188, 65' boom; 1¼ yd. bucket.

1—Link-Belt K-42, combination shovel, crane and trench hoe. Serial No. 1265, 1¼ yd. shovel front, 60' crane boom.

3—Northwest, Model Na. 105, Serial Nos. 2053, 1645 and 1522, 40' boom, 1 yd. bucket.

1—Link-Belt, K-1, Serial No. 1024, 50' boom, 1 yd. bucket.

2—Osgood Heavy Duty, Serial No. 2939 and No. 2687, combination 1 yd. shovel and crane, 40' boom.

2—Thew, Model "O" combination shovel crane and dragline, Serial No. 2801 and No. 2687, ⅝ yd. shovel fronts, 40' crane boom.

1—P & H Model No. 206, 40' boom, ⅝ yd. bucket.

1—Byers Bearcat, Serial No. 3299, 30' boom, ½ yd. bucket.

CRUSHERS

5—Gyratory crushers; 1—No. 5 Allis-Chalmers; 1—No. 5 Austin; 1—No. 5 Gates; 1—No. 3 McCully; 1—No. 0 McCully.

10—Jaw Crushers; 3—15x36" Universal; 1—15x36" Cedar Rapids; 1—15x26" Champion; 1—12x20" Acme; 3—10x20" Climax No. 2½; 1—9x16" Telsmith No. 9A; 1—9x15" Champion.

1—Set of Allis-Chalmers, smooth type crushing rolls, 42x16".

DREDGE PUMPS

1—12" Morris Heavy Duty D. C. to 100 H.P. dbl. cyl. steam engine.

3—Belt Driven: 2—Morris Manz.. 1—10", 1—8", 1—6".

HOISTS

1—2 yd. Thomas 2 speed Class L Cableway excavator hoist with 150 HP electric motor.

1—1 yd. Cedar Rapids 2 speed drag-scraper hoist with 50 HP electric or gas power.

TRACTORS AND SCRAPERS

14—2—Caterpillar D-8, Diesels with 13 yd. LeTourneau scrapers; 1—Allis-Chalmers mod. L, 12 ton crawler tractors with or without Baker bulldozer; 5—Allis-Chalmers mod. 75, 12 ton crawler tractors; 3—Caterpillar tractors; 1—mod. 65; 1—mod. 60, 10 ton; 2—mod. 30, 5 ton, 1 with derrick attachment; 1—Allis-Chalmers, model K, 5 ton tractor with Baker hydraulic bulldozer; 3—Linn; 2—Fordson, one with winch and one with derrick attachment.

WHIRLEY

1—Mod. 75 Wiley Whirley No. 2973, 20 tons cap., 75' boom. 2 D Clyde 60 HP elec. hoist and 30 HP elec. swinger, all complete. Perfect condition.

PLEASE SEND FOR COMPLETE STOCK LIST

EQUIPMENT CORPORATION OF AMERICA

1806 Rose St., Philadelphia; Phone Rittenhouse 4664 — 1119 S. Washtenaw Ave., Chicago; Phone Nevada 2400 — P. O. Box 823, Pittsburgh; Phone Federal 2000

LOCOMOTIVES SHOVELS — CRANES

Attractive Prices

1—80 Ton American 0-6-0 Switcher.
1—75 Ton Baldwin 0-6-0 Switcher.
2—40 Ton American Saddle Tanks.
1—38 Ton Vulcan Saddle Tank.
1—38 Ton Porter Saddle Tank.
2—25 Ton Plymouth—Gasoline. Standard Gauge—Rebuilt

1—Marion 480 Combination Steam Shovel and Crane.
1—52-B Bucyrus Dragline 70 ft. Boom, Atlas Imperial Diesel Engine.
1—25 Ton Browning 8-C Steam Locomotive Crane.

Birmingham Rail & Locomotive Co.
BIRMINGHAM, ALA.

NEW AND USED PIPE FOR EVERY PURPOSE

Large stocks carried everywhere for spot shipment

Jos. Greenspon's Son Pipe Corp.
National Stock Yds. (St. Clair Co.) Ill.

¼, 1, 1¼ yd. Owen & Williams Buckets
30, 35 HP Gas Hoists
50, 60, 100 HP Elec. Hoists
1¼ Nwest Shovel Attachment
1¼ B-Erie 41B Shovel attachment
1 yd. Page Dragline Bucket
½, ¾, 1¼ Gas Crawler Cranes

J. T. WALSH
Brisbane Bldg. — Buffalo, N. Y.

5½ Ft. Symons Cone Crusher

INCLUDES FINE AND COARSE BOWL

Also

Fuller Kenyon Cement Pump 5".

P&H Model 700 Combination 1¼ Dragline Shovel & Crane in Rebuilt Condition.

Material Service Corporation
33 N. LaSalle St., Chicago — Franklin 3600

Partial Equipment List

C. S. Johnson 5 compt. bin 1000 c.y. automatic batchers.
1—Bin 3 compt. 140 ton Johnson, weighing scales.
15—Compressors 525'-2600' cap. Gas, Diesel, Electric drives, Stationary & Portable.
21—Boilers—20 to 150 H.P. Vertical & Horizontal —High Pressure.
60—Hoists; 1-2-3 drums,—steam, gas & electric.
5—Derricks—Steel Stiff Leg, 10-25 T. cap.
12—Locomotives, 8-40 T. Gas, Steam, all gauges.
30—Flat cars—36" gauge, 4 T. roller bearing.

Send us your inquiries
Rail and Rail Supplies

Coast to Coast Equipment Corp.
9 Rockefeller Plaza — New York, N. Y.

Unusual Items . . . Unusually Priced!

1—6½-yd. Bucyrus 320-B Electric Shovel
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No. 19, 20 and 25S Kennedy. 7" & No. 10 Newhouse. 9A, 9B, 10B, 13A, No. 32 and No. 36 Telsmith.
No. 4, 6 and 36" TZ Traylor Gyratory Crushers.
10x15" Webb City, 12x26" Champion, 14x34" Birdsboro, 15x36" Farrel, 24x36" Carroll, 24x72" and 60x84" Traylor Jaw Crushers.
30x14", 30x30", 36x16", 40x15", 54x24" Crushing Rolls.
22x30 and 24x36" McLanahan Single Roll Crushers.
3—8 yd. Euclid Trac-Trux pneumatic tires.
2 yd. Atlas, 4 yd. Western, 36" ga. Dump Cars.
Page 1¾ yd. Bucyrus Erie 3 & 5 yd. Diesel.
Electric Draglines. 1¾ yd. Page C bucket.
90 HP Fairbanks Model 43B Diesel Engine.
110 HP Anderson "K" Diesel Engine.
2—300 HP Fairbanks 2300 V Diesel Gen. Sets.

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48 Steel Skips 6½ x 6 x 2½.
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6x8 Pebble Mill & 5x5 Batch Mill.
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110 Ton Blaw Knox 2 Compt.
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400 Barrel Butler Portable Steel Cement Bin with Fuller automatic batcher, push button control.
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36x60 Fairmount & 36x16 Allis Chalmers.
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10x8, 12x7½, 14x7, 15x9, 15x10, 16x9,16x12,16x10, 18x11, 20x8, 20x6, 20x10, 20x12, 26x12,30x15,30x13, 36x15, 36x30, 36x18, 36x14, 36x9,36x6,36x10,36x24, 42x9, 48x42, 48x36, 60x42, 84x66, 36x16, 9x36.
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42 in. McCully Mammoth Gyratory.
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4—Nos. 5, 3 & 6 Austin Gyratory.
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1—3 yd. Blaw-Knox Truck Mixer—Separate Engine drive—used one year—without truck.

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1—80 ton 2 compartment Bin.

PUMPS—from 2" to 10" Jaegers—Self-Priming Centrifugal.
MIXERS—7S—10S—14S. Low Charge and Power Loaders—late models.
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½ yard Speeder Crane—¾ yard Northwest Crane.
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4 ft. Symons Cone Crusher. Late model.
No. 10, 9 and 6 Gates Primary gyratories.
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Conveyors—35 to 150 ft. Belt & bucket.
25 ton Browning Locomotive Crane; Marion model 91 Steam Shovels; Universal Truck Crane.
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2 Ing. Rand 12x10 type ER1 Air Compressors.
50 Electric Motors 3 HP to 150 HP, all types.
25 ton Plymouth Gasoline Locomotive.
1 yd. & 1¼ yd. P & H Gas Cranes & Draglines.
180 HP Fairbanks Morse Dredge type Diesel.
120 HP Atlas 6 cyl. Diesel Power Unit, clutch.
240 HP Fairbanks Morse 200 KVA Diesel Gen. Set.

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Large Crushing Plant
66 x 84 — JAW CRUSHER

Secondary Crushers—Motors—Disc-crusher—Elec. Hoist—Conveyors—Elevators—Screens—Dust Collectors—Many Smaller Crushers.

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Good running condition—10 yrs. old

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ALL SECTIONS

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NEW RAILS—5000 tons—All Sections—All Sizes.
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PITTSBURGH NEW YORK CHICAGO

ASPHALT PLANTS
1—Semi portable and 1—railroad car plant.

BINS
2—(1200) twelve hundred ton capacity, all steel, self clearing, three compartment.

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2—2 yd. and 4 yd. tilting mixers, electric drive.

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1—Allis Chalmers M-W with hydraulically operated Bull Dozer and hydraulically operated Maney 2 yd. scraper.

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Gyratory Crushers—Sizes Nos. 3-5-6-7½-8-10 and 21 with openings 8" x 30" up to 42" x 134". All standard makes.

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Jaw Crushers with openings 8" x 16" up to 48" x 60". All standard makes.

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Complete stone crushing plant thoroughly modern, capacity 900 tons per day.

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1—Stevens Adamson 36" x 12'.

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1—Robbins live roll grizzley Type S. Model 7-36-12, opening 3½".

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1—Kennedy, Model 25.
1—Telsmith 3' cone crusher.
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1—Ingersoll-Rand XCB, 15 x 9¼ x 12, 676' capacity.
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1—450 H.P. Cooper Bessemer, 4 cylinder, 4 cycle, solid injection, 225 R.P.M. with or without rope drive generator, 2 phase, 60 cycle, 2200 volt, complete with all auxiliary equipment.
1—Same as above with direct connected generator.
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1—120 H.P., horizontal, 2 cylinder, 350 R.P.M.
1—120 H.P., Waukesha gasoline, complete with clutch, all mounted on steel frame.

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1—15 ton, 85' boom, 100' mast, all steel Guy Derrick.

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1—Single drum mine Hoist, drum 86" x 76" with 350 H.P. AC Motor.
1—National 3 drum with Swinger attached with or without 60 H.P. Waukesha Motor.
2—Sauerman steam and electric drag scraper and slack line hoists.

DRYERS
1—5' x 60' single shell, new condition.
1—5' x 36' double shell, new condition.

KILNS
4—6 x 7 x 100 feet.

PULVERIZERS
1—Jeffrey 24" x 36" Hammer Mill, Type B. Manganese fitted.
1—Sturtevant No. 1, 1½ and 2 Ring Roll Mill.
1—Raymond 0000-C.
2—7' x 8' Ball Mills silex lined.
1—3½ x 12' Ball Mills steel lined.
1—9' Dry Pan.

SCREENS
1—New Holland, single deck 2 x 6.
1—Link Belt, single deck 3 x 5.
1—Jeffrey, single deck, 4 x 7.
1—Robbins, 2 deck, heavy scalping screen, 4 x 10.
2—Telsmith 4 x 10 double deck, heavy duty.

LOCOMOTIVES, STANDARD GAUGE
2—Vulcan 55 ton, steam, power reverse, National Board Boiler, 200 lbs. working pressure, air brakes, 27,800 lbs. tractive effort, built 1933, used 10 months.
1—American 40 ton, 4 wheel Saddle Tank.
1—Vulcan 25 ton, 4 wheel Saddle Tank.
1—Heisler 42 ton, steam, geared locomotive.
2—Plymouth 10 ton, gasoline Locomotives.
2—Plymouth 25 ton, air brakes.

LOCOMOTIVES, NARROW GAUGE
3—Plymouth & Whitcomb 3 ton and 7½ ton, 24" gauge.
6—Plymouth, Vulcan and Whitcomb 7-10 and 14 ton, 36" gauge.
1—Vulcan 45 ton, steam, 36" gauge.
1—Heisler 42 ton, geared Locomotive 36" gauge.

Modern Equipment for Contractors and Quarries

A. J. O'NEILL
Lansdowne Theatre Building
Lansdowne, Pa.
Phila. Phone: Madison 7570

Screens—Gyrex 2 deck 4x10. Misc. 5x10 to 3x8. Boom, sticks, dipper, etc., for P&H ¾ yd. Buckets—⅝ yd. Page. Kiesler ⅝ yd., $150. Conveyors—24"x40'-60'-80'. 24"x60' gas port. Loco. Cranes—Browning 15 & 35 ton. Ohio 25 ton. Drag Scraper & Slackline Excavator Equipment. Universal cat. crane, bargain. Haiss loader, $250. Coal Conveyor—Barber-Greene 30' gas crawler. Cranes, shovels, drags., trench hoes; ½ yd. up. Your offers of good used equipment solicited.
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ON

RUBBER BELTING

TRANSMISSION—CONVEYOR—ELEVATOR

"V" BELTS

FOR

PUMPS—CRUSHERS—PULVERIZERS—ETC.

RUBBER HOSE

FOR

AIR—WATER—STEAM—ETC.

Partial Stock List

NEW AND HEAVY DUTY

Conveyor and Elevator Belting

Quantity	Width	Ply	Top Cover	Bottom Cover	Type
668 Ft.	36"	6	1/8"	1/16"	Conveyor
660 "	30"	6	1/8"	1/16"	"
245 "	26"	5	1/8"	1/16"	"
906 "	24"	5	1/8"	1/32"	"
298 "	24"	4	1/8"	1/16"	"
370 "	22"	8	1/16"	1/16"	Elevator
296 "	22"	8	Friction		"
1455 "	20"	5	1/8"	1/32"	Conveyor
403 "	20"	4	1/8"	1/16"	"
1738 "	18"	4	1/8"	1/32"	"
60 "	18"	8	1/4"	1/16"	Elevator
288 "	18"	6	1/8"	1/16"	"
712 "	18"	4	1/16"	1/16"	Conveyor
1096 "	16"	4	1/8"	1/32"	"
554 "	16"	4	1/16"	1/32"	"
738 "	14"	4	3/32"	1/32"	"
288 "	14"	4	1/8"	1/16"	"
110 "	12"	8	1/8"	1/16"	Elevator
226 "	10"	6	1/16"	1/16"	"

USED BELTING—Good Condition

440 Ft.	48"	8	1/8"	1/16"	
210 "	20"	7	Friction		Elevator

We will cut any of above rolls. Advise desired lengths and widths and we will promptly quote prices. Many other sizes in stock for immediate shipment.

CARLYLE RUBBER CO., Inc.
62 Park Place **New York, N. Y.**

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Several new and slightly used Engines, bought for models we have discontinued—75 H.P. and 125 H.P. Engines of both nationally known makes.

Real Savings for Quick Inventory Reduction

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COLUMBUS, OHIO

Concrete Products Equipment For Sale

BLOCK MACHINERY
Universal Stripper with Conveyor & Mixer.
5", 8", 10" & 12" Pallets, with corners.
Br. Header Att. for Anchor.
4" and 5" for Anchor & Clark lift truck.
80 Cu. Yd. per hr. Gravel Washing Plant.
Concrete Conveyor & 12 cu. yd. Mixer.
2—1½ Yd. Ready Mix Trucks.
1—150 Lb. Cap. per hr. Stoker.
CITIES FUEL & SUPPLY CO.
6639 W. National Ave. **Milwaukee, Wis.**

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FOR SALE
Up to 5000 Acres of Tennessee
PHOSPHATE LANDS
Mineral Rights or Fee Simple
BEST AND SAFEST PLACE TO INVEST IDLE MONEY
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CONSULTING ENGINEER
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Specializing in Gypsum Plants and in the Mining, Quarrying and Manufacture of Gypsum Products.

Consultation **Design**
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F. M. WELCH ENGINEERING SERVICE
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Designers of GRAVEL PLANTS for 30 years
SMALL PLANTS to meet local conditions with flexibility, ample crushing, minimum labor, low first cost and maintenance.
LARGE MODERN PLANTS for metropolitan areas.
GROUND STORAGE Plants.
OLD PLANTS modernized.
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PUNXSUTAWNEY, PA.
We drill for any mineral. We have more than fifty steam, electric and gasoline drills, adapted for any job. Satisfactory cores guaranteed. Our prices are right.
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Positions Vacant

WANTED—SALES REPRESENTATIVE
To sell well-known line of carbon and alloy steel castings and cast steel specialties, Crane Wheels, Conveyor Chain, Sprockets, Elevator Buckets, and similar parts. In reply please advise lines you are now handling, district covered and previous business experience. Address Box 949, Care of Rock Products, 309 West Jackson Blvd., Chicago, Ill.

Positions Wanted

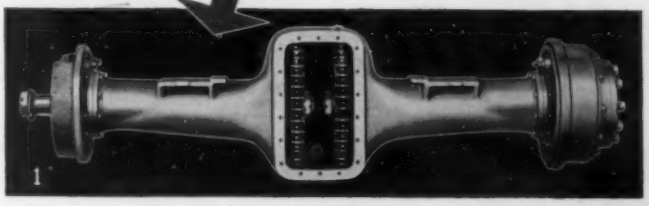
POSITION WANTED—5 YEARS EXperience as executive and manager of large European concern operating lime kilns, quarries, marble and stone industry, including building and monumental. Desire modest position with opportunity to prove ability.—Address Box 950 Care of Rock Products, 309 W. Jackson Blvd., Chicago, Ill.

POSITION WANTED BY GRADUATE Chemical Engineer, with seven years experience in the Portland Cement Industry. Experienced in operation, laboratory or sales-service work. Address Box 941, Care of Rock Products, 309 West Jackson Blvd., Chicago, Illinois.

POSITION WANTED — BY CEMENT Chemist with 20 years' experience as chemist, plant operator, and superintendent in the manufacture of Portland Cement. Location immaterial. Address Box 942, care of Rock Products, 309 West Jackson Blvd., Chicago, Illinois.

Index to Advertisers

HUSKY AXLES FOR HEAVY LOADS



KOEHRING DUMPTOR UP-KEEP COST LOW

Low up-keep cost increases the job-profit. Husky Dumptor axles carry big heavy pay-loads of rock and dirt . . . often 24 hours per day. More than enough strength is built into the axle assemblies for the toughest hauling job . . . to provide long-lasting service without breakage. Repair costs are surprisingly low . . . with Koehring Dumptors hauling rock and dirt . . . *and so is the cost per yard moved.* Use Koehring Dumptors on your next job!

KOEHRING CO • MILWAUKEE, WIS.

1. Alloy steel drive axles housed in one piece alloy steel casting. Anti-friction bearings, splined shafting, alloy steel sprockets and chain.

2. Free oscillating, spring mounted, steering axle eliminates frame bending strains, when traveling over uneven grades.

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

PREPARE THE CARTRIDGE *right*

When you work with Primacord, no cap is needed in the cartridge—Primacord is itself a detonating fuse. To prepare the cartridge, merely lace the fuse through the sides and bring it around the top in a half hitch; or thread it straight through the center and secure it with a knot at the bottom. Either method is thoroughly satisfactory.

Primacord can be used in bore holes where water or mud is present. It is a practically instantaneous blasting fuse. The powerful detonating wave travels its PETN core at 3.85 miles per second. And yet, there is an infinitesimal time delay between holes and between rows of holes that provides for relief of burden.

The Primacord Booklet is yours for the asking. Send for it today.

PRIMACORD·BICKFORD *Detonating* FUSE

THE ENSIGN-BICKFORD CO., Simsbury, Conn.

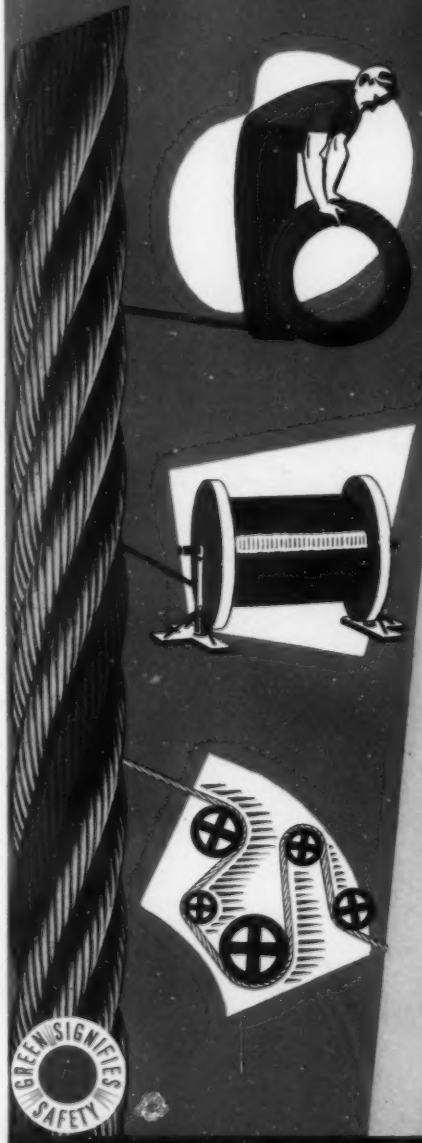
Makers of Cordeau-Bickford Detonating Fuse—and Safety Fuse since 1836

PB22

1. Tie through cartridge.
2. Half hitch branch to main line.
3. Connect main line lengths with square knot.
4. Fuse and cap on end of main line.

IMPORTANT: Branch lines should lead away from main lines at *right angles*. Avoid kinks and small loops.

"DO'S" and "DONT'S" for Re-Roping



The service life of a wire rope begins at the start of the reeving job. Here are a few practical pointers to remember when reeving wire rope.

- If your rope is in a coil—don't pull the rope out of the coil. Roll the coil away from the rope end—allowing the rope to pay out in a straight line.
- If your rope is on a reel—align the reel with the drum and keep a constant tension on the spool to avoid slack in the line. Don't pass the rope around a lead sheave so small it will put a set or crimp in the rope.
- Wherever possible avoid reverse bends. In many installations, of course, reverse bends cannot be avoided. In such cases the life destroying effect of reverse bending can largely be nullified by the use of TRU-LAY Preformed Wire Rope. Because it is preformed, TRU-LAY possesses amazing resistance to bending fatigue and invariably gives far longer service.
- ***On any wire rope problem your nearest American Cable representative can help you.***

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When you're in the market for any size excavator, check these features carefully; they mean low-cost output for you:

1 **Power** — Has it ample power for normal fast operation, with a reserve for emergencies?

2 **Transmission**—Does Power move in a straight line? How many anti-friction bearings? How many gears enclosed in oil?

3 **Clutches and Brakes**—Do they give operator **full** control of every function? How about adjustment and maintenance?

4 **Levers**—Are they conveniently grouped, easy to work?

5 **Mounting** — Does it give full mobility? Ample bearing area?

6 **Long Life** — Is it built strong to last, with full provision for easy maintenance?

We'll be glad to show you how any machine in the complete modern Bucyrus-Erie line answers these questions. The answers mean money to you, so it will pay to investigate Bucyrus-Erie — the Repeat Order Machine.

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